

4

PARVEEN ARIF ALI

## Teaching Guide

Revised Edition

# Amazing Science



OXFORD  
UNIVERSITY PRESS



# Contents

Introduction.....	2	
Unit 1	Understanding our bodies.....	5
	Lesson plans .....	8
	Worksheets.....	16
Unit 2	Growth and movement in living things .....	18
	Lesson plans .....	21
	Worksheets.....	28
Unit 3	A balanced diet .....	30
	Lesson plans .....	32
	Worksheet.....	35
Unit 4	Living things and their environment.....	36
	Lesson plans .....	39
	Worksheets.....	43
Unit 5	Matter and its states.....	45
	Lesson plans .....	48
	Worksheet.....	51
Unit 6	Air and water .....	52
	Lesson plans .....	54
	Worksheets.....	57
Assessment Units 1–6.....	59	
Unit 7	Magnets and magnetism .....	62
	Lesson plans .....	65
	Worksheet.....	69
Unit 8	Sound .....	70
	Lesson plans .....	72
	Worksheet.....	75
Unit 9	Static electricity .....	76
	Lesson plans .....	79
	Worksheet.....	82
Unit 10	Heat.....	83
	Lesson plans .....	85
	Worksheet.....	87
Unit 11	Force and machines.....	88
	Lesson plans .....	90
	Worksheets.....	93
Unit 12	Light.....	95
	Lesson plans .....	97
	Worksheet.....	100
Unit 13	The Earth.....	101
	Lesson plans .....	103
	Worksheet.....	108
Assessment Units 7–13.....	109	

# Introduction

Children want to know things. Early guidance and varied experiences do much to stimulate the development of their natural intelligence.

A teacher can play a very important role in arousing the interest of students by allowing them to discuss facts and ideas and helping them to draw conclusions from them as to why and how things happen.

The teacher can stimulate the thinking process of students by asking questions and by encouraging them to ask questions.

Experimental work enables students to test for themselves the facts that have been learnt by them, thereby making it easier for them to understand the implications of the background to their activities.

This course has been developed to provide information about the world around on which students can base their opinion, verify information, come to conclusions, and use the knowledge thus gained in their everyday life. It will help in maintaining the curiosity and enthusiasm of students who have just started studying science. Concepts developed at this stage will be of use in their studies at an advanced level later. It will help them to develop a better outlook on life.

## About the Pupil's Book:

This science series, now completely revised, has been written especially for children at the primary level. It provides information at a child's level of understanding and has a direct appeal for children who need interesting and easy to read material. Keeping in view the interests, abilities, curiosities, and needs of children, it provides stimulating learning experiences and offers enjoyable educational motivation, thus serving as a building block for further learning.

The keyword in science is curiosity. The material in the series is designed to awaken in a child the same urge that motivates in a scientist the desire to know the answer to a question. There is a wide range of topics that will interest and motivate the child.

Teachers will recognize that this series deals with those broad areas about which most children frequently express curiosity; that it provides answers to many questions they ask, and offers new and exciting information in many fields. It aims to create an awareness, as well as stimulate an interest in science.

The language is simple and easy to read and within the range of the abilities of students of each grade. Together, the text and illustrations motivate children to discuss, question, and explore.

The contents have been selected and presented in such a way as to capture and hold the interest of the students. The objective is to simplify complex ideas and present them in an interesting way. Every effort has been made to keep the language simple.

When it is necessary to use a specialized word, it has been used. When it is not self-explanatory within the context, it has been defined. Clear and well-labelled illustrations have been included, which help to identify and clarify the topics dealt with.

Good pictures and diagrams arouse and develop interest. These make lasting impressions. They help to make the text clear. They also appeal to the child's imagination, while satisfying his curiosity and often provoke a favourable reaction.

Simple practicals—interesting and stimulating presentation of factual materials—offer every chance of successful learning experiences. Knowledge of problem-solving techniques so acquired can be applied in everyday life.

It is intended, through this series, to introduce children to many of the interesting and enjoyable things in science they can learn about and do for themselves. The series also intends to develop in them a quest for knowledge and an understanding of how science is shaping the world in which they live.

## **The role of the teacher:**

It is up to the teacher to devise ways and means of reaching out to the students, so that they have a thorough knowledge of the subject without getting bored.

The teacher must use his/her own discretion in teaching a topic in a way that he/she feels appropriate depending on the intelligence level as well as the academic standard of the class.

### **To the teacher:**

With your assurance and guidance the child can sharpen his/her skills. Encourage the child to share his/her experiences. Try to relate pictures to real things. Do not rush the reading. Allow time to respond to questions and to discuss pictures or particular passages. It will enhance learning opportunities and will enable the child to interpret and explain things in his/her own way.

### **Method of teaching:**

The following method can be employed in order to make the lesson interesting as well as informative.

The basic steps in teaching any science subject are:

- (i) locating the problem
- (ii) finding a solution by observation and experimentation
- (iii) evaluating the results
- (iv) making a hypothesis and trying to explain it

### **Preparation by the teacher:**

Be well-prepared before coming to the class.

- (i) Read the text.
- (ii) Prepare a chart if necessary.
- (iii) Practise diagrams which have to be drawn on the board.
- (iv) Collect all material relevant to the topic.
- (v) Prepare short questions.
- (vi) Prepare homework, tests, and assignments.
- (vii) Prepare a practical demonstration.

The following may also be arranged from time to time.

- (i) Field trips
- (ii) Visits to the laboratory
- (iii) A show of slides or films
- (iv) Plan projects

The usual strategy which is easy as well as effective can be adopted:

- (i) Before starting a lesson, make a quick assessment of the previous knowledge of the students by asking them questions pertaining to the topic. Relate them to everyday observation of their surroundings or from things that they have seen or read about in books, magazines, or newspapers.

- (ii) Explain the lesson.
- (iii) Write difficult words and scientific terms on the board.
- (iv) Ask students to repeat them.
- (v) Help students to read text.
- (vi) Show materials, models, or charts.
- (vii) Make diagrams on the board.
- (viii) Perform an experiment if necessary.
- (ix) Ask students to draw diagrams in their science manuals.
- (x) Students should tackle objective questions independently.
- (xi) Ask questions from the exercises.
- (xii) Answers to questions to be written for homework
- (xiii) The lesson should be concluded with a review of the ideas and concepts that have been developed or with the work that has been accomplished or discussed.

## **Conclusion:**

The teacher can continue the learning process by not only encouraging and advising the students, but also by critically evaluating their work.

It is not necessary that the lesson begins with a reading of the textbook. The lesson can begin with an interesting incident or a piece of information that will hold the interest of the students and they will want to know more about the topic.

The topic should then be explained thoroughly and to check whether the students are following or not, short questions should be asked every now and then.

Sketches and diagrams on the board are an important aspect to the teaching of science, but too much time should not be spent on them as the students lose interest. An alternative to board drawing is a ready-made chart or one made by the teacher can be displayed in the class. The use of visual material keeps students interested as well as helps to make mental pictures which are learnt quickly and can be recalled instantly. Pupils should be encouraged to draw and can be helped by the teacher. Diagrams that are not in the text should either be copied from the board or chart, or photocopies can be made and distributed in the class.

Simple experiments can be performed in the class. If possible, children may be taken to the laboratory occasionally and be shown specimens of plants and animals, chemicals and solutions, and science apparatus, etc.

Practical work arouses interest in science. Class activities can be organized in such a way that the whole class participates either in groups or individually, depending on the type of work to be done or the amount of material available.

It is hoped that the above guidelines will enable teachers to teach science more effectively, and develop in their students an interest in the subject which can be maintained throughout their academic years, and possibly in their lives as a whole.

These guidelines can only supplement and support the professional judgement of the teacher but in no way can they serve as a substitute for it.



## Understanding our bodies

### **Teaching objectives:**

- to explain that our body is a wonderful machine
- to explain that each part of the body has a special job to do
- to explain that the body is made up of tiny units called cells
- to explain that the body needs food to produce energy to do work
- to explain that the body is made up of a bony framework called the skeleton
- to explain that the muscles are attached to bones and they help to bring about movement
- to explain that the body needs energy, which is produced by the process of breathing
- to explain that the gaseous exchange in the body takes place by the respiratory system
- to explain that the heart helps to circulate blood in the body
- to explain that teeth are of various shapes and sizes
- to explain the functions of teeth
- to explain that digestion of food takes place in the digestive system
- to explain that the brain and the nervous system control all the functions of the body
- to explain that the brain is made up of nerve cells
- to explain the structure and function of the sensory organs

### **Teaching strategy:**

Show the students a chart of the human body. Ask them to name the various parts. Write the names of the parts of the body on the board and ask the students to describe the function of each part.

Show the students the model of a human skeleton. Ask the students to feel the bones in their own arms and legs and to count the number of bones. Explain that there are more than 200 bones in the body. Show them the types of joints and the amount of movement each joint can make. Describe the functions of the skeleton.

**Ask:** How is movement brought about in the skeleton? Explain that muscles are attached to bones. Encourage the children to flex their arms and feel the muscles on the upper arm **Ask:** What happens to the muscles? Explain that muscles can contract and relax and this helps the body to move.

**Ask:** How does food pass along the food canal? Explain that there are muscles in the walls of the food canal which contract, relax, and help the food to pass along the food canal.

Call a student to the front and ask him/her to take deep breaths. **Ask:** What do you notice about the movement of the chest when the student is breathing? Explain that lungs inside the chest are filled with air when we breathe in, and they collapse when we breathe out. These breathing movements help the lungs to take in oxygen and breathe out carbon dioxide.

**Unit 1 Understanding our bodies**

Then ask the students to feel their pulse and count the number of pulse beats. Explain that the number of pulse beats that they can count is actually the number of times the heart beats. **Ask:** What is the function of the heart? Explain that the heart pumps blood to all parts of the body. It provides food and oxygen to the cells.

Similarly, ask the students to count the number of teeth they have. **Ask:** Why do you have teeth? What are the front teeth used for? What are the flat big teeth at the back of your jaws used for? Show the students the model of a denture and explain the structure and function of the different kinds of teeth.

Ask the students to chew a morsel of bread for about a minute. **Ask:** Has the taste of the bread changed? Does it taste sweet? Explain that the process of digestion of food starts in the mouth, the saliva in the mouth helps to change the starch that we eat, as part of our food, into sugar. Other changes take place in the stomach and the intestines. Finally, the food is absorbed into the blood by the intestines.

**Ask:** Who controls all the functions of the school? What is the work of the ‘Head’ of an institution? Explain to the children that just like the ‘Head’ of the School, our brain is the main controlling organ in the body. It is connected to all the organs by nerve cells and is responsible for all the functions of our bodies running smoothly.

Ask the children to feel their backbone. **Ask:** What do you think the backbone is made of? Explain that the backbone is not a single bone, but that it is made up of a series of small bones, which are connected to each other. The spinal cord, which is a fat bundle of nerve cells, passes through the backbone and it gives off branches of nerves to the lower part of the body and the legs. Show the students models of the eye, ear, and the skin. Explain the structure of each in turn.

**Ask:** How do these organs help the body? Explain the functions of the eye, ear, and the skin. Discuss with the students how they can take care of their body. Divide the class into groups. Ask one group to make a chart of ‘Healthy habits’ and the other group to make a chart of ‘Taking care of the body’.

## **Answers to Exercises in Unit 1**

1.
  - a) Food is the fuel for the human body.
  - b) Tiny parts that make up the human body are called ‘cells’.
  - c) 206 bones make up the human skeleton.
  - d) There are more than 600 muscles in the body.
  - e) The heart pumps blood to all the different parts of the body.
  - f) The process of breaking down of food into tiny pieces so that the body can use it is called ‘digestion’.
  - g) The brain is made up of millions of cells called nerve cells, which carry messages to and from all parts of the body.

<b>2. <u>Part of the body</u></b>	<b><u>Function</u></b>		
skeleton	gives the body its shape		
stomach	helps to digest food		
teeth	used to chew food		
lungs	provide oxygen to the cells		
heart	pumps blood all around the body		
brain	controls all the parts of the body		
3. a. incisors	b. canine	c. premolars	d. molar
4. lungs, heart, brain			

## **Additional Exercise**

### **MCQs**

- (a) The fuel for the human body is \_\_\_\_\_.  
petrol                  food                  oil                  [food]
- (b) The part of the body that is made of tough elastic tissue is \_\_\_\_\_.  
muscles                  cells                  bones                  [muscles]
- (c) The bones of the body are joined together to make the \_\_\_\_\_.  
blood                  skeleton                  nerves                  [skeleton]
- (d) When we breathe in, the lungs become filled with \_\_\_\_\_.  
air                  water                  blood                  [air]
- (e) The body cells need \_\_\_\_\_ gas to stay alive.  
nitrogen                  carbon dioxide                  oxygen                  [oxygen]
- (f) There are \_\_\_\_\_ different types of teeth.  
1                  2                  4                  [4]
- (g) Meat eating animals have long, sharp teeth called \_\_\_\_\_.  
incisors                  canines                  molars                  [canines]
- (h) \_\_\_\_\_ in the stomach helps to kill germs.  
Juice                  Acid                  Salt                  [Acid]
- (i) Special cells in the eyes help us to see \_\_\_\_\_.  
pictures                  colours                  shadows                  [colours]
- (j) The skin has \_\_\_\_\_ that can sense pain, temperature, and pressure.  
cells                  nerves                  muscles                  [nerves]

## Lesson plan

Date:

Time: 40 mins

Unit: 1 <b>Topic: Understanding our bodies</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
1. Your body	<ul style="list-style-type: none"><li>• to explain that the human body is a wonderful machine</li><li>• to explain that the human body is made up of many parts, each of which has a special function</li><li>• to explain that the body is made up of cells</li><li>• to explain that the body needs food for energy to do work</li><li>• to explain that the body is protected and supported by a skeleton</li><li>• to explain that muscles help the body to move</li></ul>	<ul style="list-style-type: none"><li>• explain that the human body is like a machine made up of many parts, each of which has a special function to perform</li><li>• explain that different cells make up the different parts of the body</li><li>• explain that the skeleton is made up of bones which protect the inner organs</li><li>• explain that movement of the body is brought about by muscles which are attached to the bones</li></ul>	A model of the human skeleton, diagrams and charts of the human body, different kinds of cells, muscles, and joints	Reading: p 2 HW: Q1 (a) (b) (c) (d)

**Key words:** human body, skeleton, organ, cell, bone, muscle, contract, relax

**Method:** Show the students a chart of the human body. Help them to identify the various parts. Discuss the functions of each part. Write the names of the parts of the body on the board and ask the students to describe the functions of each part.

**Ask:** What is the fuel of the human machine? Explain that the body, like all machines, needs fuel which is food. Food is used to build the body and also to give it energy to move and work.

What is the body made up of? Explain that the body is made up of tiny parts called cells. There are millions of cells in the body.

Show the students a model of the human skeleton. **Ask** them to feel the bones of their own arms and legs and to count the number of bones in their hand. Explain that there are more than 200 bones in the human body. Discuss the types of joints and the amount of movement each joint can make. Describe the functions of the skeleton.

**Ask:** How do the different parts of the human body move? Explain that there are muscles attached to the bones. **Ask** the students to flex their arms and feel the muscles in the upper arm. **Ask:** What happens to the muscles when you bend your arm? Explain that muscles contract and relax to move the parts of the body.

**Ask:** How does food pass along the food canal? Explain that there are muscles in the walls of the food canal which contract and relax to push the food through the food canal.

## Lesson plan

Date:

Time: 40 mins

Unit: 1 <b>Topic: Understanding our bodies</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. The lungs and the heart	<ul style="list-style-type: none"> <li>• to explain that the lungs are used in breathing</li> <li>• to explain that the heart pumps blood to all parts of the body</li> </ul>	<ul style="list-style-type: none"> <li>• describe how the lungs perform gaseous exchange</li> <li>• explain that the body needs energy which is produced by the exchange of gases in the lungs</li> <li>• describe how the heart pumps blood to all parts of the body, enabling the blood to carry oxygen to all the cells</li> </ul>	A specimen of the lungs of a sheep, a sheep's heart, a chart of the human respiratory system, a chart of the human circulatory system	Reading: p 3 Activity: 1 HW: Q1 (e)

**Key words:** breathe, chest, lungs, air, heart, blood, oxygen

**Method:** Ask a student to come to the front of the class and take a deep breath. **Ask:** What did you notice about the movement of the chest when (name) took a breath? Explain that the lungs, which are inside the chest, fill up with air when we breathe in, and are squeezed when we breathe out. These breathing movements enable the lungs to take in oxygen from the air and breathe out carbon dioxide.

Now ask the students to feel their pulse and count the number of pulse beats in one minute. Explain that the number of pulse beats counted is actually the number of times the heart beats in one minute. **Ask:** What is the function of the heart? Explain that the heart pumps blood to all parts of the body. It transports food and oxygen to the cells.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 1</b> <b>Topic: Understanding our bodies</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Teeth	<ul style="list-style-type: none"> <li>• to explain the functions of the teeth</li> <li>• to identify the different kinds of teeth</li> <li>• to discuss tooth decay and gum disease</li> </ul>	<ul style="list-style-type: none"> <li>• describe the functions of the different kinds of teeth</li> <li>• describe the structure of a typical tooth</li> <li>• explain the common causes of tooth decay and gum disease</li> </ul>	Samples and models of the different kinds of teeth, a chart of the structure of a tooth, a model of a denture	<p>Reading: p 3, 4  Activity: 2, 3  HW: Q3</p>

**Key words:** tooth, crown, root, jaw, enamel, incisor, canine, premolar, molar, plaque, bacteria, saliva, cavity

**Method:** Ask the students to count their teeth. **Ask:** Why do you have teeth? What are the front teeth used for? What are the large, flat teeth at the back of the jaw used for? Show the students the models of the denture and the different kinds of teeth and explain their functions. Draw and label the longitudinal section of a tooth on the board and explain the functions of the root, the crown, and the enamel.

**Ask:** Have any of you had toothache? Have you had a tooth extracted? Discuss tooth decay and its causes. Explain that eating too much sugary food causes bacteria in the mouth to produce a sticky film on the teeth, called plaque. If this is not removed by regular brushing, it causes tooth decay. It can also cause teeth to fall out. Discuss the importance of keeping the teeth clean.

Do the activities in class.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 1</b> <b>Topic: Understanding our bodies</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
4. The stomach	<ul style="list-style-type: none"><li>• to explain the structure and function of the digestive system</li><li>• to describe some common disorders of the digestive system</li></ul>	<ul style="list-style-type: none"><li>• describe the structure of the digestive system</li><li>• explain how food is digested as it travels along the digestive tract</li><li>• identify the functions of the parts of the digestive system</li><li>• describe what happens to digested food</li><li>• explain that bad eating habits can cause disorders of the digestive system</li></ul>	Charts and diagrams of the digestive system	Reading: p 4, 5 HW: Q1 (f)

**Key words:** stomach, digestion, chew, swallow, muscle, juice, acid, germ, small intestine, blood

**Method:** Ask the students to chew a small piece of bread for about a minute.

**Ask:** Has the taste of the bread changed? What does it taste like?

Explain that the process of digestion of food starts in the mouth. The teeth help to break the food into small pieces. The saliva in the mouth softens the food and changes any starch in the food into sugar. Explain the changes that take place in the stomach and the intestines. Finally the food is absorbed into the blood through the intestines. Explain that food that is not digested is excreted from the body.

Discuss the disorders of the digestive system that can be caused by bad eating habits. Eating clean, healthy food is important. Over-eating can cause acidity and indigestion. Drinking unclean water and eating unhygienic or stale food can cause diarrhoea and vomiting; not eating high-fibre foods like fruits and vegetables can cause constipation.

Lesson plan  
[REDACTED]

Date:

Time: 40 mins

Unit: 1 <b>Topic: Understanding our bodies</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
5. The brain	<ul style="list-style-type: none"><li>to explain the structure of the brain and its functions</li></ul>	<ul style="list-style-type: none"><li>describe the structure of the brain and its functions</li></ul>	Models and charts of the structure of the brain and the nerve cells	Reading: p 5 CW: Q2 HW: Q1 (g)

**Key words:** brain, sense organ, nerve cell, spinal cord, nerve

**Method: Ask:** Who controls everything that happens in the school? What is the work of the head of an institution?

Explain that the brain is the controlling organ of the body. It is connected to all the other organs by special cells called nerve cells and it is responsible for the smooth-running of all the functions of the body.

Ask the students to feel their backbone. **Ask:** What do you think the backbone is made up of?

Explain that the backbone is not a single bone: it is made up of a series of small bones which are connected to each other. A fat bundle of nerve cells called the spinal cord passes through the backbone and branches of nerves run from it to all the other parts of the body.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 1</b> <b>Topic: Understanding our bodies</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resource/Materials</b>	<b>Activities/CW/HW</b>
6. The skin, the eye, the ear	<ul style="list-style-type: none"> <li>• to explain the structures and functions of the skin, the eye and the ear</li> <li>• to describe some common skin diseases</li> </ul>	<ul style="list-style-type: none"> <li>• describe the structure and explain the functions of the skin, the eye and the ear</li> <li>• explain the causes and symptoms of some common skin diseases</li> </ul>	Models and charts of the skin, the eye, and the ear	<p>Reading: p 5, 6, 7            CW: Make a poster of: 'Ways to take care of your body', and display it in the classroom.            HW: Describe the functions of:            the skin, the eye, the ear.            Worksheets</p>

**Key words:** skin, sense, ringworm, fungus, scabies, mite

**Method:** Show the students models of the skin, the eye, and the ear. Discuss their structures and functions. Explain that these organs are called sensory organs because they enable us to learn about, or sense, changes in our surroundings. Discuss some common skin diseases and how we should take care of our bodies.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Draw a line from the organ to its place in the human body.

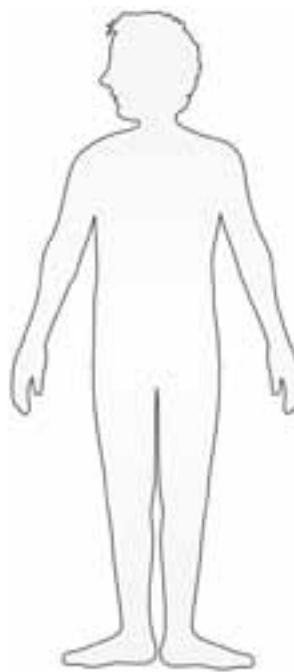
intestine

heart

stomach

lungs

brain



2. Write the name of the organ which:

digests food \_\_\_\_\_

controls the working of the whole body \_\_\_\_\_

pumps blood to all parts of the body \_\_\_\_\_

takes in air \_\_\_\_\_

absorbs digested food \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Draw a labelled diagram of a tooth.

2. Fill in the table:

<b>Name of tooth</b>	<b>Shape</b>	<b>Function</b>
Incisor		
Canine		
Premolar		
Molar		



## Growth and movement in living things

### **Teaching objectives:**

- to explain that living things are quite different from non-living things
- to explain that living things eat, breathe, excrete, move, grow, and are sensitive
- to explain that animals have special body parts to help them to move
- to explain that muscles make the body move
- to explain that the skeleton helps the body to move
- to describe the different kinds of skeletons in animals
- to describe how plants move
- to explain that unicellular plants move by flagella
- to explain that the eye-spot helps tiny plants to move towards light
- to explain that plant stems grow towards light
- to explain that plant roots grow down
- to explain that plant movements can be seen in flowers
- to explain that the body of an animal grows till it reaches adult size
- to explain that some animals undergo physical changes from the time of birth to the adult stage
- to explain that some animals can grow back damaged or cut parts
- to describe how plants keep on growing all their lives
- to explain that plants grow from the tips of the roots and stems
- to describe the structure of a bud
- to explain that other parts of a plant can grow into new plants

### **Teaching strategy:**

Explain the difference between living and non-living things on the basis of feeding, breathing, excretion, movement, and growth. **Ask:** Why do you eat food? Explain the uses of food in the body. **Ask:** Why do living things breathe? Which gas do we breathe in? Why is oxygen gas necessary for all living things? Explain the process of oxidation of food for releasing energy. **Ask:** What happens to the extra water that we drink? Explain the process of excretion and why it is necessary. **Ask:** Can a stone move by itself? Explain that living things can move, while this characteristic is not shared by non-living things. **Ask:** Do plants move? Explain that all living things are sensitive. Plants need sunlight to make food, so the stem grows towards it. Roots need to suck water for the plant, so they move downwards. **Ask:** How does an animal move? Explain the movements in animals. **Ask:** How do fish swim? How do insects move? How do birds move? How does a rabbit move? How does a snake move? Show the students charts of various animals and explain to them the various ways in which these animals move.

**Ask:** How do you bend your arm or knee? Encourage them to feel their biceps on bending and flexing



their arm. Then explain the position of joints and the attachment of muscles to the bones. Explain that muscles can contract and relax and that they help in moving the body parts. **Ask:** Does a cockroach have bones? Does a caterpillar or earthworm have bones? Explain the hard outer covering of insects as the exoskeleton. Explain that muscles are attached to the exoskeleton. Show the students an earthworm. **Ask:** Does it have a skeleton? How does it move? Explain the movement of an earthworm and other soft-bodied animals. Explain hydrostatic skeleton in a caterpillar.

**Ask:** Can we see a plant moving? Can it jump, walk, or crawl? Explain that plant movements are very slow. Show the students a diagram of a euglena or chlamydomonas. Explain that it is a unicellular simple plant. Point out the eye-spot and flagellum. Explain how it moves towards light. **Ask:** Where does a sunflower face? What happens to the leaves of a touch-me-not, when you touch them? Explain sensitivity and movement in plants.

**Ask:** Where does a chick come from? Does a fish lay eggs or have babies? What is a caterpillar? Explain that all animals grow big. They may change their shape and form to resemble their parents.

**Ask:** Which part of your body grows long? Explain that the whole body of an animal grows. **Ask:**

Does a puppy grow till it becomes as big as a horse? Does a fish grow as big as a whale? Explain that animals' babies grow as big as their parents and then stop growing. Explain the changes that take place before a frog's eggs become complete frogs. Explain the stages in the life cycle of a butterfly and a cockroach. **Ask:** What happens if we cut our finger or bruise a knee? Will our finger grow back again if it was cut off completely? Explain regeneration of body parts in some animals.

**Ask:** What will happen if you cut off the tip of a stem? Explain that growth in plants takes place by buds. Take a twig and pull off the leaves. Show the students the position of buds on the stem. Make a diagram of a bud on the board. Explain how a bud grows into a branch or flower. **Ask:** Do you know how potato or ginger is grown? Show the students a potato tuber, a piece of ginger, and an onion bulb. Explain the presence of buds and that they can grow into new plants. Draw pictures of runners and cuttings and explain how new plants can be grown from other parts of the plant.

## Answers to Exercises in Unit 2

**3. Animal/plant**

	<b>Work</b>
sheep	produce wool and meat
poultry	provides meat and eggs
cattle	provide milk and meat
bees	pollinate flowers and make honey
cotton and jute plants produce	fibre for making cloth
crops	provide food grains
trees	provide wood for building houses and making furniture

4. The students will draw and label the life cycle of a butterfly.  
5. The students will label the life cycle of a frog.

## **Additional Exercise**

### **MCQs**

- (a) Large water animals like the whale have \_\_\_\_\_ to swim.  
flippers                  wings                  fins                  [flippers]
- (b) The hard outer covering of the body of an insect is called \_\_\_\_\_.  
skin                  shell                  exoskeleton                  [exoskeleton]
- (c) Some tiny organisms swim in water using a \_\_\_\_\_.  
hair                  flagellum                  fins                  [flagellum]
- (d) The buds of plants have tiny folded up \_\_\_\_\_.  
leaves                  stem                  roots                  [leaves]
- (e) An onion bulb has thick fleshy leaves which store a lot of \_\_\_\_\_.  
water                  food                  salts                  [food]
- (f) A starfish can grow back \_\_\_\_\_ which has been cut off.  
an arm                  a leg                  a tail                  [an arm]
- (g) A gardener can grow new plants from small pieces of stem called \_\_\_\_\_.  
twigs                  runners                  cuttings                  [cuttings]
- (h) A \_\_\_\_\_ is a baby frog.  
tadpole                  chick                  worm                  [tadpole]
- (i) A caterpillar is the \_\_\_\_\_ of a butterfly.  
egg                  larva                  pupa                  [larva]
- (j) We can get some important chemicals and \_\_\_\_\_ from plants.  
medicines                  wool                  meat                  [medicines]

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 2</b> <b>Topic: Growth and movement in living things</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Living and non-living things	• to explain that living things are quite different from non-living things	• list the differences between living and non-living things	Pictures of living and non-living things, a chart showing things that living things can do	Reading: p 11 CW: Make a list of all the things that living things can do. HW: Q1 (a)

**Key words:** eat, breathe, waste, move, grow, feel

**Method:** Show the students pictures of living and non-living things. Ask them to sort them into living and non-living things.

**Ask:** Why is a cockroach a living thing? Why is a stone a non-living thing?

Explain the differences between living and non-living things on the basis of things that living things can do which non-living things cannot.

List the characteristics of living things and explain their importance.

## Lesson plan

Date:

Time: 40 mins

Unit: 2 <b>Topic: Growth and movement in living things</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. Movements in animals	<ul style="list-style-type: none"> <li>• to explain that animals move in various ways</li> <li>• to explain that animals have special body parts for movement</li> <li>• to explain that the skeleton and muscles help to move the body</li> <li>• to describe different kinds of animal skeletons</li> </ul>	<ul style="list-style-type: none"> <li>• explain that movements in animals are brought about by special body parts which are assisted by muscles and bones</li> <li>• explain that not all animals have the same kind of bony skeletons as humans: insects and other soft-bodied animals have hard outer coverings called exoskeletons, and caterpillars have water inside their bodies that supports them and helps them to move</li> </ul>	<p>Pictures of animals, birds, insects, worms, fish, snakes, dolphins, seals, etc.</p> <p>diagrams of bones and muscles</p>	<p>Reading: p 12, 13</p> <p>Activity: 2</p> <p>HW: Q1 (b) (c) (d)</p>

**Key words:** fin, wing, leg, flipper, skeleton, joint, exoskeleton

**Method: Ask:** In what ways do animals move? How do fish swim? How do birds and insects fly? How does a rabbit hop and jump? Show the students pictures of various animals and discuss their movements.

**Ask:** How do you bend your arm or knee? Ask them to feel their arm muscles as they bend and straighten their arms. Explain the positions and functions of the joints and the attachment of muscles to the bones. The muscles contract and relax and this brings about body movements.

**Ask:** Does a cockroach have bones? Explain that most insects have a hard outer covering which is called an exoskeleton. Their muscles are attached to the exoskeleton.

**Ask:** Does an earthworm or caterpillar have an exoskeleton? How do they move? Explain that an earthworm moves by using its muscles. A caterpillar has a watery substance inside its body which helps to support the body as well as to move it.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 2</b> <b>Topic: Growth and movement in living things</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Movement in plants	<ul style="list-style-type: none"> <li>• to explain that plants move</li> <li>• to explain that plant stems move towards light and the roots move downwards</li> <li>• to explain that some small plants have special types of movement</li> </ul>	<ul style="list-style-type: none"> <li>• explain that plants move, but their movements are not so obvious as those of animals</li> <li>• explain that some tiny water plants move using special structures</li> </ul>	Pictures of different kinds of plants, slides of some microscopic plants such as euglena and chlamydomonas, specimen of a touch-me-not plant	<p>Reading: p 13, 14          CW: Draw diagrams of a euglena and a chlamydomonas.          HW: Q1 (e)</p>

**Key words:** flagellum, eye-spot

**Method:** **Ask:** Have you seen a plant moving? Can a plant jump, walk, or crawl?  
 Explain that plant movements are very slow.  
 Show the students pictures or slides of a euglena or chlamydomonas. Explain that these are very tiny, single-celled plants. They live in water and they move with the help of tiny hair-like structures called flagella. They have eye-spots which help them to distinguish between light and shade. **Ask:** In which direction does the head of a sunflower face? What happens to a touch-me-not plant when you touch it? Explain that these plants are sensitive to light and touch. They move according to the type of external stimulus that they feel.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 2</b> <b>Topic: Growth and movement in living things</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
4. Growth in animals	<ul style="list-style-type: none"> <li>• to explain that the body of an animal grows until it reaches adult size and some animals undergo physical changes from the time of birth to the adult stage</li> <li>• to explain that animals can grow back cut or damaged parts of their bodies</li> </ul>	<ul style="list-style-type: none"> <li>• explain that animals use food to grow</li> <li>• explain that animals do not have special growing points, from where their bodies grow</li> <li>• explain that animal bodies stop growing once they reach adult size</li> <li>• explain that most animal babies resemble their parents when they are born</li> <li>• explain that some animals are quite different at birth and undergo developmental changes before they become adults</li> <li>• explain that some animals can grow back or repair damaged body parts</li> </ul>	Pictures of animal babies, picture of starfish and lizard, diagrams of the life cycles of the butterfly and frog	<p>Reading: p 15 Collect pictures of baby animals and paste them in your science journals.</p> <p>HW: Q1 (f) CW: Q4, Q5</p>

**Keywords:** parent, baby, life cycle

**Method:** Show the students pictures of baby animals. **Ask:** Where does a chick come from? Does a fish lay eggs or does it have babies? What is a caterpillar? Show the students charts of the life cycles of different animals. Explain that all animals grow big. They may change their shape and form to resemble their parents. **Ask:** Which part of your body grows long? Explain that the whole body of an animal grows. **Ask:** Does a puppy grow as big as a horse? Does a fish grow as big as a whale? Explain that animal babies grow only as big as their parents, and then they stop growing. Explain, with the help of a chart, the developmental changes that take place from the time a frog spawns until the development of a complete frog. Also discuss the stages in the development of a butterfly and a cockroach.

**Ask:** What happens when we cut a finger or bruise a knee? Would our finger grow back if it were cut off completely? Explain that in some animals like the starfish and lizard, parts of the body can grow back.

## Lesson plan

Date:

Time: 40 mins

Unit: 2 <b>Topic: Growth and movement in living things</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
5. Growth in plants	<ul style="list-style-type: none"> <li>• to explain that plants continue to grow throughout their lives</li> <li>• to explain that plants grow from the tips of the roots and stems</li> <li>• to explain what a bud is</li> <li>• to explain that new plants can grow from other parts of the plant</li> </ul>	<ul style="list-style-type: none"> <li>• explain that plants are growing all the time, and that plants have special cells at the tips of the roots and stems which help in plant growth</li> <li>• explain that new branches and flowers grow from buds</li> <li>• explain that other parts of the plant, such as the eyes of a potato and the onion bulb, can grow into new plants; new plants can also grow from parts of the stem called cuttings and runners</li> </ul>	Specimens of plants, germinating seeds, potato tuber, onion bulb, runners of grass, cuttings of the rose plant, posters of the life cycles of flowering plants	<p>Reading: p 16, 17 Activity: 1 Draw and label a diagram of the life cycle of a flowering plant.</p> <p>CW: Q2 HW: Q1 (g) (h) (i) Project: p 20</p>
<p><b>Key words:</b> tip, bud, tuber, eye, bulb, cutting, runner</p> <p><b>Method:</b> Show the students a potted plant. <b>Ask:</b> What would happen if we cut off the tip of the stem? Explain that growth in plants takes place at the tips. Pull the leaves off a twig and show the students the position of the buds on the stem. Draw a diagram of a bud on the board. Explain how the bud grows into a branch or a flower. <b>Ask:</b> Do you know how a potato plant or an onion plant is grown? Show the students a potato tuber and an onion bulb; show them the buds, and explain that the buds can grow into new plants. Show the students specimens of runners and cuttings and explain how new plants can be grown from other parts of the plant.</p>				

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 2</b> <b>Topic: Growth and movement in living things</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
6. Uses of plants and animals  Population and food needs	<ul style="list-style-type: none"> <li>to explain that plants and animals are very useful for humans</li> <li>to explain that as the population of the world is increasing, more food is needed</li> </ul>	<ul style="list-style-type: none"> <li>explain that we get food and clothing from animals and plants. We also get wood for building houses and making furniture</li> <li>describe ways in which the quantity and quality of food can be improved</li> </ul>	Pictures and charts of how plants and animals are useful, pictures of crop fertilizers and sprays	<p>Reading: p 17, 18, 19 Collect pictures of useful plants and animals. Paste them in your science journal and list the things that we get from them. HW: Q3</p>

**Key words:** cattle, sheep, meat, milk, wool, leather, butter, yoghurt, cheese, poultry, fish, crop, fertilizer, population

**Method:** Show the students the pictures and charts and explain how plants and animals are useful to humans. **Ask:** What do we get from cattle? From sheep and goats? From poultry? From insects? List all the answers on the board.

**Ask:** How are plants useful to humans? What do we get from crops? From trees? Discuss the uses of plants.

**Ask:** What are crops? Discuss the methods of growing crops. Discuss the increase in population and the increasing demand for food. Find out ways of increasing food production. **Ask:** Why do farmers spray their crops with insecticides? Why are fertilizers used in the fields? Discuss the need for insecticides and the use of fertilizers in improving the quality and quantity of food crops.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Draw a labelled diagram of the life cycle of a butterfly.

2. Label the given diagram of the life cycle of a flowering plant.



Name: \_\_\_\_\_

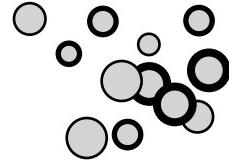
Date: \_\_\_\_\_

Name the part of the body which helps the organism to move:

<b>Organism</b>	<b>Body part</b>
euglena	
shark	
butterfly	
eagle	
kangaroo	
dolphin	
earthworm	
human body	



# UNIT 3



## A balanced diet

### Teaching objectives:

- to explain the importance of food
- to explain the components of food and their functions
- to explain rules for keeping healthy

### Teaching strategy:

**Ask:** What is food? Why do we eat food? Which types of food give us energy? Why do we eat oily and fatty foods in winter? Explain that foods called carbohydrates and fats give us energy. **Ask:** Why does a person become fat? Explain that fats can be stored in the body. Show pictures of carbohydrates and fats. Write the names of food substances containing carbohydrates and fats.

**Ask:** Why do we eat meat? Explain that proteins help the body to grow and repair itself. Show pictures of protein enriched foods. Write the names of foods containing proteins. **Ask:** Why do we eat fruits and vegetables? Explain that for a healthy body we need vitamins and minerals, which we get from eating fresh fruits and vegetables. **Ask:** Do we eat grass? Explain that our bodies cannot digest plant material. This is called fibre. We eat fibre foods to keep our intestines in good working order. **Ask:** Why do we drink water? Explain that all substances are carried by the blood in solution form to all parts of the body. When our body needs water, we feel thirsty. Our body loses water by sweating and urination. **Ask:** Why must we eat a balanced diet? Why should we eat fresh fruits and vegetables? Why should you eat meals at regular times? Why shouldn't you remain hungry for very long? Why should you exercise? Why must you rest? Why must you wash and keep yourself clean? Discuss the rules for keeping good health. Explain the meaning of a balanced diet. Write a list of the rules to be observed to keep the body strong and healthy.

### Answers to Exercises in Unit 3

1. (a) Food provides the body with energy. New cells are made from food. Food is needed for growth and repair of damaged parts. We need food to stay healthy.
- (b) Food that is taken into the body is first changed into simple substances that dissolve in the blood so that they can go into the cells and be used by the body.
- (c) Plants take carbon dioxide gas from the air, and water and mineral salts from the soil to make simple sugars, such as glucose.
- (d) Without minerals plants become weak and unhealthy. Their leaves become yellow and their stems become weak. The growth of plants is also affected.
- (e) Extra food that is made in the leaves is stored in other parts of the plant, such as underground roots, underground stems, fruits, and seeds.



- (f) Proteins, fats, and carbohydrates are called ‘primary food substances’.  
(g) Mineral, salts, and vitamins are called ‘welfare foods’.  
(h) Eating the right kind of food, in the right amounts, is called a balanced diet.  
(i) Fibre in our food is used for helping the food we eat to pass easily through the digestive system.

2. (a) meat, eggs (b) Carbohydrates (c) butter, cheese  
(d) carrots, green vegetables, milk (e) Vitamin B (f) oranges, lemons  
(g) strong bones, teeth (h) Calcium (i) liver, spinach

3. (a) If we eat too much food, the body becomes fat.  
(b) If we eat too little food, we become thin and weak.

## Additional Exercise

MCQs

- (a) Most green plants make their own food from materials that are taken from \_\_\_\_\_.  
air and soil      air and Sun      air and water      [air and soil]

(b) A potato is an underground \_\_\_\_\_.  
root      stem      bulb      [stem]

(c) Seeds may store starch and \_\_\_\_\_.  
oil      water      sugar      [oil]

(d) Proteins, fats, and carbohydrates are called \_\_\_\_\_.  
primary food substances      secondary food substances      welfare foods  
[primary food substances]

(e) Welfare foods are \_\_\_\_\_.  
water and vitamins      water and minerals      vitamins and minerals  
[vitamins and minerals]

(f) \_\_\_\_\_ are used for the growth of the body.  
Proteins      Fats      Carbohydrates      [Proteins]

(g) There are about \_\_\_\_\_ different minerals in our food.  
10      15      20      [20]

(h) A substance that helps to carry substances from one part of the body to another is \_\_\_\_\_.  
air      food      water      [water]

(i) A mineral which helps in making red blood cells is \_\_\_\_\_.  
calcium      iron      sodium      [iron]

(j) Fibre in our diet helps in \_\_\_\_\_.  
respiration      excretion      digestion      [digestion]

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 3</b> <b>Topic: A balanced diet</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Food of plants  Storage of food in plants	<ul style="list-style-type: none"> <li>• to explain the importance of food</li> <li>• to explain how green plants make their own food</li> <li>• to identify what a plant needs to make its food</li> <li>• to explain where plants store food</li> </ul>	<ul style="list-style-type: none"> <li>• explain that all living things need food</li> <li>• describe the uses of food in the body</li> <li>• explain that plants store the food that they make in different parts such as roots and stems</li> </ul>	A food chart, chart showing the mineral needs of plants, a diagram of photosynthesis in plants, specimens of storage organs in roots and stems, a cactus plant	Reading: p 23  CW: Q1 (a) (b) (c)  HW: Q1 (d) (e)

**Key words:** food, growth, repair, healthy, glucose, mineral

**Method:** Show the students a chart of different kinds of food. **Ask:** What is food? Why do we eat food? Discuss the types of food and the uses of food for the body. Explain that food provides energy, it helps to make new cells, and it is needed for growth and repair. We also need food in order to stay healthy. List the uses of food on the board.

**Ask:** What happens to the food that we eat? Revise the process of digestion of food, and its absorption by the body.

**Ask:** Do plants eat? What is the food of plants? How do they eat? Discuss the process of photosynthesis and the production of simple sugars such as glucose.

**Ask:** Do plants need other things besides glucose? Explain the mineral needs of plants, and the effects of not getting different minerals.

**Ask:** Do plants use up all the food that they make? What happens to the extra food? Show the students specimens of the storage organs of plants and explain that extra food made by plants is stored in the roots and stems for later use. Water is stored in the stems of cactus plants. Fruits store sugars, and seeds usually store starch and oil.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 3</b> <b>Topic: A balanced diet</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. Food of animals	<ul style="list-style-type: none"> <li>• to explain that, unlike plants, animals cannot make their own food</li> <li>• to list the types of food that animals eat</li> <li>• to explain what is meant by a balanced diet</li> <li>• to explain the importance of a balanced diet</li> </ul>	<ul style="list-style-type: none"> <li>• explain that because animals cannot make their own food, they depend on plants and other animals for their food</li> <li>• list the different kinds of foods that animals eat to remain healthy</li> <li>• explain what constitutes a balanced diet</li> <li>• list the components of a balanced diet</li> </ul>	Specimens of different kinds of food, a chart of primary food substances and welfare foods	<p>Reading: p 24, 25, 26, 27  Activity: 2  CW: Q1 (f) (g), Q2  HW: Q1 (h) (i), Q3</p>

**Key words:** primary food substance, welfare food, balanced diet, carbohydrate, protein, fat, oil, vitamin, mineral, fibre

**Method:** Show the students pictures of different foods. **Ask:** Which foods give us energy? Why do we eat oily and fatty foods in winter? Explain that they help to build and repair the body and give us energy.

With the help of charts and pictures, discuss the importance of primary and welfare food substances.

**Ask:** Why do most people eat meat? Explain that proteins help the body to grow and repair itself. List the names of other protein-rich foods.

Discuss the importance of carbohydrates and fats for the body. Explain that fats are stored in the body.

Contd.

**Ask:** Why do we eat fruit and vegetables? Explain that they contain vitamins and minerals which are important for the healthy growth of the body. Also discuss the importance of fibre in our diet. Explain that fibre is the indigestible part of our food, which helps to keep our digestive system in good working order. **Ask:** Why do we drink water? Explain that all substances are carried by the blood to all parts of the body. When our body needs water, we feel thirsty. Our body loses water through sweating and urination.

**Ask:** Can you think of one food or drink that contains all the things necessary for a balanced diet? Explain that milk and eggs are complete diets. They contain all the food substances in the right amounts. Milk is the ideal food for babies, and eggs and milk are given to people who are weak or ill.

Date:

Time: 40 mins

34

Unit: 3 <b>Topic: A balanced diet</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
3. Healthy living	<ul style="list-style-type: none"><li>to discuss the rules for healthy living</li></ul>	<ul style="list-style-type: none"><li>explain the importance of healthy living</li><li>list the rules for healthy living</li></ul>	A table of rules for healthy living	Reading: p 27 Make a poster of healthy habits and display it in your classroom.

**Key words:** health, hygiene

**Ask:** Why should we eat a balanced diet? Why should we eat fresh fruit and vegetables? Why should we eat meals at regular times? Why should we not remain hungry for very long? Why should we exercise? Why must we rest? Why must we wash and keep ourselves clean? Discuss the rules for maintaining good health. Draw up a list of rules to follow in order to keep the body strong and healthy.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Group 1	Group 2	Group 3	Group 4	Group 5
sweets desserts chocolates	chicken fish beef	butter cheese French fries	fruit vegetable bread	water milk eggs

1. i. State which group(s) contain:
    - a) carbohydrates \_\_\_\_\_
    - b) lots of sugar \_\_\_\_\_
    - c) fibre \_\_\_\_\_
    - d) vitamins and minerals \_\_\_\_\_
    - e) lots of fat \_\_\_\_\_
    - f) a healthy form of energy and vitamins \_\_\_\_\_
  - ii. Which group helps you grow? \_\_\_\_\_
  - iii. Eating too much of which group:  
could lead to heart disease? \_\_\_\_\_  
could damage your teeth? \_\_\_\_\_
- 
2. Explain how eating too much food could affect your health.  
How would eating too little affect your health?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# UNIT 4

## Living things and their environment

### **Teaching objectives:**

- to explain that all living things are interrelated to each other and to their environment
- to explain that the food for all living things comes from plants
- to explain that the energy of the Sun passes from plants to animals
- to describe what animals eat
- to describe a food chain
- to describe a food web
- to explain what is meant by adaptations

### **Teaching strategy:**

Explain the interdependence of all living things and how animals and human beings depend on plants. **Ask:** What does a cow eat? Which animals eat plants? Explain herbivores with examples. **Ask:** What does a lion eat? Which animals eat meat? Explain carnivores with examples. **Ask:** Do we eat plants or animals? Explain omnivores with examples. **Ask:** How do plants get their food? Explain photosynthesis. Explain how plants store energy in the sugars that they make. **Ask:** What does a hen eat? Explain that a hen eats grains made by plants. We eat the chicken and in this way we all are connected in a food chain. Explain some simple food chains by giving examples.

**Ask:** What happens to organisms when they die? Explain the presence of decomposers in the soil and the recycling of minerals by plants. **Ask:** What does a snake eat? What does a hawk eat? Explain a food web and how one kind of food is eaten by many different animals by giving examples. **Ask:** Where does a camel live? How can it live in the desert for so many days without food and water? Explain the meaning of adaptation. Explain with examples why animals adapt to their environment. **Ask:** Why does a lion have sharp teeth? Why does a porcupine have quills? Explain that adaptation enables an animal to survive in a particular environment. Explain the various adaptations of animals, birds, and plants for the type of environment that they live in.

### **Answers to Exercises in Unit 4**

1. (a) All the food in the world comes from green plants. They can make food.
- (b) The energy of the Sun passes from plants to animals.
- (c) Food energy passes from plants to animals in a long chain called food chain.
- (d) The dead plants and animals are broken down by bacteria in the soil.
- (e) The special body parts which an animal or plant has developed to fit in its surroundings is called an adaptation.

- (f) Animals that live in very cold places have thick fur on their bodies and they have a thick layer of fat under their skins.
2. (a) non-living (b) Sun  
(c) herbivores (d) carnivores  
(e) Omnivores (f) decomposers  
(g) adapted (h) environment  
(i) needle-like (j) thick, fleshy
3. (a) sharp claws and teeth (b) hard shell  
(c) horns (d) hoofs  
(e) sharp claws and beak (f) spines  
(g) lives in herds (h) poison sting  
(i) long sticky tongue (j) needle-like mouth
4. (a) i) Refer to page 36 of Pupil's Book.  
ii) Students may refer to the food web on page 36 of Pupil's Book to develop their own models  
(b) i) rabbit, grasshopper  
ii) fox, snake, hawk, frog  
iii) bird
5. (a) Plants that grow in cold places have thin, needle-like leaves.  
(b) Plants that grow in hot places have thick, fleshy stems that can store water.  
(c) Some plants have a sticky juice or a strong smell so that animals may not eat them.

## Additional Exercise

### MCQs

- (a) All those things that are around an organism and which affect its way of life is called its \_\_\_\_\_.  
locality area environment [environment]
- (b) The part of the Earth where living things are found is called \_\_\_\_\_.  
hemisphere atmosphere biosphere [biosphere]
- (c) Three-fourths of the Earth's surface is covered with \_\_\_\_\_.  
air water land [water]
- (d) One-fifth of the air is a gas called \_\_\_\_\_.  
oxygen nitrogen hydrogen [oxygen]
- (e) The \_\_\_\_\_ provides energy for all living things.  
Earth Sun Moon [Sun]
- (f) The gas that plants use for making their food is \_\_\_\_\_.  
oxygen nitrogen carbon dioxide [carbon dioxide]

- (g) The soil contains many \_\_\_\_\_ which help plants and animals to grow healthy.  
vitamins                  minerals                  salts                  **[minerals]**
- (h) \_\_\_\_\_ have special teeth that help them to chew leaves and grass.  
Herbivores              Carnivores              Omnivores              **[Herbivores]**
- (i) Bacteria and fungi which feed on dead plants in the soil are called \_\_\_\_\_.  
herbivores              carnivores              decomposers              **[decomposers]**
- (j) Several food chains are inter-connected to form a \_\_\_\_\_.  
food cycle              food chain              food web              **[food web]**

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 4</b> <b>Topic: Living things and their environment</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. What is an environment?	<ul style="list-style-type: none"> <li>to explain that all living things are inter-related and that living things are related to their environment</li> <li>to explain that the part of the Earth where living things are found is called the biosphere</li> </ul>	<ul style="list-style-type: none"> <li>explain that all living things depend on each other as well as on non-living things for food, energy, support, and shelter</li> <li>explain that the biosphere contains all the important substances that living things need</li> <li>describe the importance of water, air, light, minerals, and temperature for life on Earth</li> </ul>	Pictures of different environments, and the types of living things found in them, pictures of the biosphere, a globe	<p>Reading: p 31, 32, 33 Activity: 2 What is an environment? What are the components of the biosphere? HW: Q1 (a)</p>

**Key words:** environment, landscape, biosphere, water, air, light, mineral, temperature, surroundings

**Method: Ask:** Where do we live? Where do animals live? From where do plants get food? From where do we get our food? Explain that all living things depend on each other for food, energy, support, and shelter.

**Ask:** What is an environment? Explain that all those things that are around an organism and which affect its way of life are called its environment. Discuss different kinds of environment and the types of animals and plants living there. Show the students a globe or a chart of the biosphere. Explain that the biosphere is the part of the Earth which supports living things.

**Ask:** What are the basic needs of all living things? Discuss the different components of the biosphere and the importance of each to life on Earth.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 4</b> <b>Topic: Living things and their environment</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. What do animals eat?	<ul style="list-style-type: none"> <li>• to describe what animals eat</li> <li>• to explain that the food for all living things comes from plants</li> <li>• to explain how the energy of the Sun passes from plants to animals</li> <li>• to explain that different animals, eat different kinds of food</li> </ul>	<ul style="list-style-type: none"> <li>• explain that animals eat food that is produced by plants</li> <li>• explain that plants use the energy from the Sun to produce their food</li> <li>• explain how the stored energy in plants is passed on from plants to animals</li> <li>• explain that herbivores eat plants, carnivores eat animals and omnivores eat animals and plant both</li> </ul>	A chart of the food cycle, pictures of herbivores, carnivores, and omnivores	<p>Reading: p 33, 34, 35 Paste pictures of herbivores, carnivores, and omnivores in your science journal. CW: Q2 (a) to (f)</p>

**Key words:** herbivore, carnivore, omnivore

**Method:** Remind students about where humans, animals, and plants get their food. Explain the inter-dependence of all living things, including how human beings and other animals depend on plants. Revise the process of photosynthesis and how food is stored in plants. Ask the students to name some animals that eat plants. Explain that animals that only eat plants are called herbivores. Discuss the characteristics of herbivores.

Ask the students to name some animals that eat the flesh of other animals. Explain that animals that only eat meat are called carnivores. Discuss the characteristics of carnivores.

**Ask:** Do we eat only plants? Do we eat only meat? Discuss the characteristics of omnivores.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 4</b> <b>Topic: Living things and their environment</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Energy for living things	<ul style="list-style-type: none"> <li>to explain how energy is transferred from the Sun to plants and animals</li> <li>to explain a food chain and a food web</li> </ul>	<ul style="list-style-type: none"> <li>explain that plants trap the energy of the Sun by photosynthesis</li> <li>describe how human beings and other animals obtain energy from plants by eating them</li> <li>explain how all living things are linked to each other by food chains and food webs</li> </ul>	Charts and diagrams of photosynthesis, the food cycle, food chains, food webs	Reading: p 35, 36 Activity: 1 HW: Q1 (b) (c) (d) CW: Q4 (a) (b)

**Key words:** producer, consumer, decomposer, food chain, food web

**Method:** Explain that green plants are called producers, because they produce their own food with the help of sunlight. The energy of the Sun is stored in them. Plant-eating animals called herbivores eat the plants and obtain energy from them. When carnivores eat herbivores, some of the energy is transferred to them. In this way plants, the producers, transfer the Sun's energy to the herbivores and carnivores, the consumers. When the producers and consumers die, their bodies are broken down by microscopic organisms living in the soil. These tiny organisms are called decomposers because they break down, or decompose, the bodies. This recycling of minerals by the decomposers helps to keep the soil fertile.

Explain the food cycle with the help of a chart or diagram on the board.

Explain that the passing of food energy from the producers to the consumers is called a food chain.

Show the students the chart of a food web. Discuss how one animal is the food of many others, and how animals are dependent on each other for food.

## Lesson plan

Date:

Time: 40 mins

Unit: 4 <b>Topic: Living things and their environment</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
4. Adaptations	<ul style="list-style-type: none"><li>• to explain what an adaptation is</li><li>• to explain how animals and plants are adapted to live in a particular environment</li></ul>	<ul style="list-style-type: none"><li>• explain that an adaptation is a change in an animal or plant that enables it to live in a particular environment</li><li>• describe some adaptations in animals and plants</li></ul>	Pictures of animals and plants living in different environments	Reading: 36, 37, 38, 39 CW: Q3, Q5 HW: Q1 (e) (f)

**Key words:** adapted, protected

**Method:** Show the students pictures of animals living in different environments. **Ask** questions about the animal: Where does it live? What does it eat? How does it catch its prey? How can it hide from its enemies?

Discuss various adaptations in animals, and their benefits to the animals. Explain that adaptations enable an animal to survive in a particular environment.

Discuss how some plants are adapted for survival in the type of environment in which they live.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Match the description to the component of the Earth.

<b>Description</b>	<b>Component</b>
1. The part of the Earth where living things are found. It contains all the important substances that living things need.	atmosphere
2. All living things that are around an organism, and which affect its way of life. It provides food, energy, support, and shelter.	biosphere
3. Three-quarters of the Earth's surface is covered with it. Three-quarters of the body of an organism is made up of it.	environment
4. A layer around the Earth which contains gases that are used by animals for breathing, and used by plants for making their food.	water
5. Provides energy for all living things. Plants use it to make their food.	minerals
6. Helps animals and plants to grow healthy and strong. Plants absorb them from the soil. Animals get them by eating plants.	temperature
7. Plants and animals need it to a suitable degree in order to live. If it becomes too high or too low, living things may die.	light

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Study the food chain :

lettuce → caterpillar → bird → cat

Write the name of: a herbivore \_\_\_\_\_

a carnivore \_\_\_\_\_

a consumer \_\_\_\_\_

a producer \_\_\_\_\_

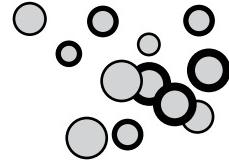
2. Use the food chains below to create a food web.

lettuce → rabbit → fox

grass → rabbit → hawk

grass → grasshopper → lizard → fox

lettuce → grasshopper → lizard → hawk



## Matter and its states

### Teaching objectives:

- to explain that a mixture is not a pure substance
- to describe the different kinds of mixtures
- to describe a solution
- to describe soluble and insoluble substances
- to describe a suspension
- to describe an emulsion
- to describe an alloy
- to describe the methods of separating mixtures
- to explain filtration and evaporation
- to explain how to separate the components of black ink

### Teaching strategy:

Take a beaker of water and add a teaspoon of salt to it and stir. Show it to the students. Put some sand in the water and stir. Show it to the students. **Ask:** What has happened to the salt? What has happened to the sand? Mix a teaspoon of salt and sand in a cup. Show it to the students. Mix some iron filings with some sand. **Ask:** Can we separate the salt from the sand? Can we separate the iron filings from the sand? Explain the formation of a solution. Explain that water is called the solvent and salt is the solute. **Ask:** Can you separate the salt from the solution? Explain that salt and sugar are soluble in water and they dissolve more in hot water. **Ask:** Is sand soluble in water? Explain that sand is insoluble in water.

Take some water in a test tube and put some powdered chalk in it and shake it. **Ask:** In the solution clear or milky? Explain the formation of a suspension. Take a test tube of water and add a few drops of cooking oil to it. Shake it. **Ask:** Has the solution become clear or milky? Why has it become milky? Explain the formation of an emulsion. Place the test tube in a rack for a few minutes. Show the students the layer of oil on top of the water. Show the students some coins. Explain that the coins are made of mixtures of metals called alloys. Explain that some things are made of copper and brass. Copper and brass are alloys and so is steel. Set up an experiment to demonstrate filtration of a mixture of sand and water. Set up an experiment to demonstrate the evaporation of water from a solution of salt and water. Separate iron filings from sand with a magnet. Show the students how the components of black ink can be separated by adding drops of water to an ink spot on filter-paper.

## Answers to Exercises in Unit 5

1. (a) Anything that takes up space and has weight is called matter. Matter is made up of very tiny particles called atoms.  
(b) A mixture contains more than one substance. It is not a pure substance.  
(c) A solution is a liquid mixture in which the solute completely dissolves in the solvent.  
(d) It is a clear solution because sugar has completely dissolved in water.  
(e) In a suspension, the particles of the solute do not dissolve in the solvent, but remain suspended as in chalk and water.  
(f) An emulsion is a milky mixture of oil and water. A mixture in which the substances do not mix properly is called an emulsion.  
(g) A mixture of metals is called an alloy. For example, brass is an alloy of copper and zinc.  
(h) A mixture of sand and water can be separated by filtering it.  
(i) A solution of salt and water can be separated through evaporation of water by heating.  
(j) A mixture of sand and iron filings can be separated by stirring it with a magnet.

2. hard, fixed volume, fixed shape  
can flow, no fixed shape, fixed volume  
can flow, no fixed shape, no fixed volume

3. (a) gases (b) carbon dioxide  
(c) dissolves (d) solute  
(e) solvent (f) dissolve  
(g) insoluble (h) alloys

4. (a) air (b) colas  
(c) sherbet (d) sugar solution  
(e) brass

5. (a) filtration (b) evaporation

6. (a) melting  
(b) evaporation  
(c) condensation  
(d) freezing

## Additional Exercise

MCQs

- (a) The state of matter depends on the amount of \_\_\_\_\_ between the particles.  
space                      solids                      water                                  [space]

(b) When a substance is \_\_\_\_\_ its particles begin to move freely and a change of state occurs.  
cooled                      heated                      evaporated                                  [heated]

(c) The melting point of ice is \_\_\_\_\_ degrees centigrade.  
0                              10                              20    [0]

- (d) When water is cooled its particles \_\_\_\_\_ energy and move closer to each other, and it freezes to form ice.
- gain                  lose                  do not lose                  [lose]
- (e) The temperature at which a liquid boils is called its \_\_\_\_\_.
- freezing point                  boiling point                  melting point                  [boiling point]
- (f) The change of state from a liquid to a gas is called \_\_\_\_\_.
- evaporation                  melting                  freezing                  [evaporation]
- (g) The change of state from vapour to a liquid state is called \_\_\_\_\_.
- evaporation                  melting                  condensation                  [condensation]
- (h) When sugar dissolves in water a \_\_\_\_\_ is formed.
- emulsion                  solution                  suspension                  [solution]
- (i) To separate sand from a mixture of sand and water we need to \_\_\_\_\_ the mixture.
- filter                  stir                  heat                  [filter]
- (j) A mixture of sand and iron filings can be separated by stirring the mixture with a \_\_\_\_\_.
- spoon                  wooden ruler                  magnet                  [magnet]

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 5</b> <b>Topic: Matter and its states</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Matter  How a change of state occurs	<ul style="list-style-type: none"> <li>to revise the states of matter</li> <li>to explain how a change of state occurs</li> </ul>	<ul style="list-style-type: none"> <li>explain that matter exists in three states</li> <li>describe the arrangement of particles in the different states of matter</li> <li>explain how a change of state occurs</li> </ul>	Samples of solids, liquids, and gases, diagrams of the arrangement of particles in solids, liquids, and gases, ice cubes, a beaker, a Bunsen burner, a saucer, a laboratory thermometer	Reading: p 43, 44, 45  Activity: 1  CW: Q1 (a), Q6  HW: Q2

48

**Key words:** matter, atom, state, solid, liquid, gas, particle, melt, freeze, boil, evaporation, condensation

**Method:** Revise what the students have learned about matter in previous lessons. **Ask:** What is matter? What is matter made up of? What are the three states of matter? What do the states of matter depend upon? Explain that matter is made up of very tiny particles called atoms. The state of matter depends upon the arrangement of these particles. Ask the students to explain the arrangement of particles in the three states of matter. **Ask:** Can the state of matter change? How? Explain how a change of state occurs. Discuss the effects of heating and cooling to bring about a change in state. Explain that heating makes the particles in a substance gain energy. They begin to move faster and push each other apart. As they begin to move around more freely, a change of state occurs. Perform an experiment to prove that a change of state occurs when ice is heated. Explain the process of melting. Place the bulb of a laboratory thermometer in the melting ice. **Ask:** What is the temperature? Explain that the temperature at which a solid turns into a liquid is called its melting point. The melting point of ice is 0° Centigrade.

**Ask:** What do you think happens to water when it freezes? Explain that when a liquid cools, its particles lose energy and they slow down. They move closer to each other and the liquid becomes a solid. **Ask:** What is the freezing point of water? Measure the temperature of ice with a thermometer. It is 0° Centigrade.

Put some water in a beaker and heat it. **Ask:** What is happening to the water? Show them the bubbles that are forming. Explain that the water is boiling. Hold the thermometer in the water for a minute. **Ask:** What is the temperature of boiling water? It is 100° Centigrade.

Put some water in a saucer and leave it on the table for a while. **Ask:** What has happened to the water? Explain that the water has changed into a gas (vapour). This change from a liquid into a gas is called evaporation. **Ask:** Can water vapour change into liquid water? Put some ice cubes in a beaker. **Ask:** What do you see on the outer surface of the beaker? From where has this water come? Explain that water vapour in the air changes into water when it touches a cold surface. This is called condensation. This is how dew is formed.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 5</b> <b>Topic: Matter and its states</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. Mixtures	<ul style="list-style-type: none"> <li>• to explain what a mixture is</li> <li>• to explain that a mixture is not a pure substance</li> <li>• to explain different kinds of mixtures</li> </ul>	<ul style="list-style-type: none"> <li>• explain that a mixture is not a pure substance</li> <li>• explain that a mixture can be formed by mixing solids, liquids and gases</li> <li>• describe different kinds of mixtures</li> </ul>	Beakers, stirrer, sugar, salt, sand, water, powdered chalk, oil, a coin	Reading: p 45, 46, 47 Activity: 2 CW: Q1 (b) to (h) HW: Q4 Say what kind of a mixture will be formed by: sugar+ water _____ chalk + water _____ oil+ water _____ copper+ zinc _____

**Key words:** mixture, solution, dissolve, solute, solvent, soluble, insoluble, suspension, emulsion, alloy

**Method:** Stir a teaspoonful of salt into a beaker of water. **Ask:** What do you see?

Stir a teaspoonful of sand into a beaker of water. **Ask:** What do you see? Explain the formation of a solution. The salt is the solute and the water is the solvent. The clear mixture is called a solution. The sand and water do not form a solution because the sand is not soluble in water.

Stir a teaspoonful of powdered chalk into a beaker of water. **Ask:** What do you see? Is the mixture clear? Explain that some substances do not dissolve in water: they are insoluble, e.g. sand. This kind of a mixture is called a suspension.

Add a teaspoon of cooking oil to a beaker of water and stir. **Ask:** What do you see? Is the mixture clear? Explain that the water has become cloudy because oil is not soluble in water. It has formed an emulsion. If you leave the beaker undisturbed for some time, the oil forms a layer on the top of the water.

Show the students a coin. **Ask:** What is this coin made of? Is it made of just one kind of metal? Explain that coins and ornaments are made of a mixture of metals called alloys. Brass is an alloy of copper and zinc, bronze is an alloy of copper and tin.

## Lesson plan

Date:

Time: 40 mins

Unit: 5 <b>Topic: Matter and its states</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
3. Separating mixtures	<ul style="list-style-type: none"><li>to describe the methods of separating mixtures</li></ul>	<ul style="list-style-type: none"><li>explain that insoluble solids can be separated from liquids by filtering; soluble solids can be separated from liquids by evaporation; iron can be separated from sand by stirring with a magnet; an insoluble solid can be separated from a liquid by decanting.</li></ul>	Funnel, stand, beaker, water, sand, china dish Bunsen burner, tripod, magnet, iron filings, black ink	Reading: p 47, 48 Activity: 3 CW: Q5 HW: Q1 (i) (j) Q3

**Key words:** filter, evaporate, stir, add, decant**Method:** Set up an experiment to demonstrate filtration of a mixture of sand and water.

Set up an experiment to demonstrate the evaporation of water from a solution of salt and water. Set up an experiment to separate iron filings from sand with a magnet. Show the students how the components of black ink can be separated by adding drops of water to a spot of black ink on a filter paper. Explain that this process is called paper chromatography. Add some sand to a beaker of water. Allow the sand to settle at the bottom of the beaker. Gently pour off the clear water from the top. Explain that this process of separating a mixture is called decanting.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Name the process by which :

ice changes to water \_\_\_\_\_

water changes into ice \_\_\_\_\_

water vapour turns to water droplets \_\_\_\_\_

liquid water changes into water vapour without heating \_\_\_\_\_

liquid water changes into water vapour on heating \_\_\_\_\_

2. Write the name of the kind of mixture:

sugar + water \_\_\_\_\_

chalk + water \_\_\_\_\_

cooking oil + water \_\_\_\_\_

copper + tin \_\_\_\_\_

3. Name the process by which you will separate a mixture of :

sugar and water \_\_\_\_\_

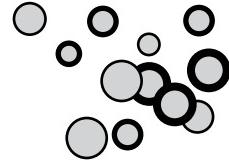
sand and water \_\_\_\_\_

sand and iron filings \_\_\_\_\_

a mixture of coloured pigments such as those in black ink \_\_\_\_\_

stones and water \_\_\_\_\_

# UNIT 6



## Air and water

### Teaching objectives:

- to explain that the Earth is surrounded by a layer of air
- to explain the composition of air
- to explain the importance of each component of air
- to explain the difference and similarities between breathing and burning
- to explain ventilation and its importance
- to explain air pollution and its harmful effects
- to explain ways to reduce air pollution

### Teaching strategy:

Tell the students to wave their hands up and down. **Ask:** What do you feel? Teach the students to make a paper fan. Tell them to wave it in front of their faces. **Ask:** What do you feel? Explain that we are surrounded by air. **Ask:** What gas do we breathe in? What gas do we breathe out? Explain the various components of air and the importance of each. **Ask:** Why is oxygen important? How do things burn? Light a candle and cover it with a glass. **Ask:** What happened to the candle? Why? Explain that oxygen supports burning. Explain that oxygen is used by living things to breathe and stay alive. Tell a student to blow on a cold window pane. **Ask:** What do you see? Explain that the tiny droplets of water are made from the water vapour in your breath.

Light a candle and cover it with a gas jar. **Ask:** Why did the candle go out? What do you see inside the jar? Explain that burning things need oxygen. The water droplets inside the jar show that burning produces water vapour. **Ask:** Why do we keep doors and windows open in summer? Why do we open the windows when too many people are in a room? Explain that warm air rises because it is light, while cold air is heavy. When the air inside a room becomes warm, it begins to rise. There must be ventilators near the ceiling, which will allow the warm air to go out. Cool air will come in to take its place from the doors and windows. This process is called ventilation. That is why we have exhaust fans in kitchens, bathrooms, offices, and halls.

**Ask:** Why do people go to hill stations and the countryside? Why must people living in a city have a bath every day? Why does furniture in our houses and schools become dusty? Discuss air pollution and where pollutants come from. Discuss the harmful effects of air pollution. Explain the formation of acid rain and its harmful effects. **Ask:** How can we reduce air pollution? Is city air more polluted than the countryside air? Why? Explain that growing population and industry are causing more pollution. Guide the students to make posters and write slogans to help reduce air pollution.

### Answers to Exercises in Unit 6

1. (a) Air is a mixture of gases.  
(b) The gases found in air are: nitrogen, oxygen, carbon dioxide, water vapour, dust, and other gases.  
(c) Plants use carbon dioxide to make their food.






## Additional Exercise

MCQs

- (a) The gas which is used for making chemical compounds called nitrates is \_\_\_\_\_.  
oxygen                    nitrogen                    hydrogen                    [nitrogen]

(b) The gas used by plants for making their food is \_\_\_\_\_.  
oxygen                    nitrogen                    carbon dioxide                    [carbon dioxide]

(c) Oxygen in the air helps living things to \_\_\_\_\_.  
breathe                    eat                            excrete                            [breathe]

(d) When a candle burns in air it produces carbon dioxide and \_\_\_\_\_.  
water vapour            oil                            coal                                    [water vapour]

(e) Cool air has \_\_\_\_\_ pressure.  
low                        high                            no                                    [high]

(f) Burning coal and oil produces harmful gases such as \_\_\_\_\_.  
ammonia                    sulphur dioxide            oxygen                            [sulphur dioxide]

(g) Water vapour in the air rises and changes back into tiny droplets of water which form \_\_\_\_\_.  
clouds                    rain                            snow                                    [clouds]

(h) Poisonous chemicals and germs in fresh water cause \_\_\_\_\_ pollution.  
air                        water                            land                                    [water]

(i) Fish and other river life cannot live without \_\_\_\_\_.  
oxygen                    carbon dioxide                    sulphur dioxide                    [oxygen]

(j) Poisonous gases and chemicals mix with rain water to produce \_\_\_\_\_.  
sewage                    smoke                            acid rain                            [acid rain]

## Lesson plan

Date:

Time: 40 mins

Unit: 6 <b>Topic: Air and water</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
1. Air, breathing, burning, ventilation	<ul style="list-style-type: none"> <li>• to describe air as a mixture of gases</li> <li>• to explain the importance of the components of air</li> <li>• to differentiate between burning and breathing</li> <li>• to explain what is meant by ventilation and the importance of ventilation</li> </ul>	<ul style="list-style-type: none"> <li>• explain that air is a mixture of gases</li> <li>• describe the importance of the components of air</li> <li>• explain the difference between burning and breathing</li> <li>• describe what ventilation is and explain the importance of adequate ventilation</li> </ul>	A pie chart of the composition of air, a candle, a chart showing the movement of air due to ventilation	Reading: p 52, 53 Activity: 1, 2, 3, 4, 5 HW: Q1 (a) to (e)

**Key words:** air, nitrogen, nitrate, breathing, burning, ventilation

**Method:** Use a pie chart to explain the composition of air. Discuss the importance of air for all living things. Explain that nitrogen in the air is used for making nitrates which are added to the soil as fertilizer; water vapour in the air falls as rain; oxygen is breathed by living things to keep them alive, and is necessary for burning to take place. **Ask:** What gas do we breathe in? What gas do we breathe out? Discuss the importance of oxygen for breathing and burning, and of carbon dioxide for photosynthesis.

**Ask:** Why do we keep doors and windows open in summer? Why do we open the windows when there are a lot of people in the room? Explain that warm air rises because it is lighter than cold air. When the air inside a room becomes warm, it begins to rise. There must be ventilators near the ceiling which will allow the warm air to go out. Cool air will come in through the windows to take its place. This process is called ventilation. We fit exhaust fans in kitchens, bathrooms, offices, and halls to provide ventilation.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 6</b> <b>Topic: Air and water</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. Air pollution	<ul style="list-style-type: none"> <li>• to explain what air pollution is</li> <li>• to describe the harmful effects of air pollution</li> <li>• to discuss how air pollution can be reduced</li> </ul>	<ul style="list-style-type: none"> <li>• explain how air pollution is caused</li> <li>• describe the harmful effects of air pollution</li> <li>• suggest ways to reduce air pollution</li> </ul>	Pictures showing the harmful effects of air pollution	Reading: p 54, 55, 56 Activity: 6 HW: Q1 (f) (g)

**Key words:** air pollution, sulphur dioxide, lead, acid rain, chemical, cancer

**Method:** Show the students some pictures of the harmful effects of air pollution.

**Ask:** Why do people go to hill stations and the countryside for holidays? Why must people living in a city have a bath every day? Why does the furniture in our houses and schools become dusty? Discuss air pollution and its causes. **Ask:** Why is the city air more polluted than the air in the countryside? Explain that the growing population and industry are causing more pollution. Cutting down trees and clearing the land for building houses and roads is also adding to air pollution.

Discuss how burning coal and oil produces harmful gases such as sulphur dioxide. Harmful gases and chemicals come from factory chimneys. Petrol and diesel oil used in car engines release chemicals such as lead into the air: these can cause cancer and other lung diseases.

**Ask:** What is acid rain? Explain that when poisonous gases and chemicals in the air mix with rain water, they produce acid rain. Discuss the harmful effects of acid rain.

**Ask:** How can we reduce air pollution?

Help the students to make posters and write slogans to raise awareness of air pollution and how it can be reduced.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 6</b> <b>Topic: Air and water</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Water	<ul style="list-style-type: none"> <li>• to explain that every living thing on Earth needs water</li> <li>• to describe the states of water</li> <li>• to explain the water cycle</li> <li>• to discuss the causes and effects of water pollution and how water pollution can be reduced</li> </ul>	<ul style="list-style-type: none"> <li>• explain the importance of water for all living things</li> <li>• explain how water is recycled in nature</li> <li>• describe the ways in which water becomes polluted, describe the harmful effects of water pollution, suggest ways to reduce water pollution</li> </ul>	Pictures of how water is used, a diagram of the water cycle, pictures illustrating how water becomes polluted by waste water from homes, farms, and factories	<p>Reading: p 55, 56, 57  Draw a picture showing the ways in which water is being polluted.</p> <p>CW: Q2, Q3  HW: Q1 (h) (i) (j)</p>

**Key words:** evaporation, condensation, poisonous, chemical waste

**Method:** Discuss the importance of water for all living things. Explain why water should be clean. Revise the water cycle and how water evaporates from the sea to form clouds and rain. Rain falls on mountains and plains and rainwater is carried back to the sea.

Discuss and list the ways in which water becomes polluted. Explain the ways in which animals and plants are affected by polluted water. Ask the students to suggest ways of preventing or reducing water pollution.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Complete the table of the gases in the atmosphere to show their uses:

<b>Gas</b>	<b>Use</b>
nitrogen	
oxygen	
carbon dioxide	
water vapour	

2. Write the harmful effects of the following pollutants:

<b>Pollutant</b>	<b>Harmful effects</b>
sulphur dioxide	
lead	
acid rain	
chemical waste from factories	
germs from human and animal waste	

Name: \_\_\_\_\_

Date: \_\_\_\_\_

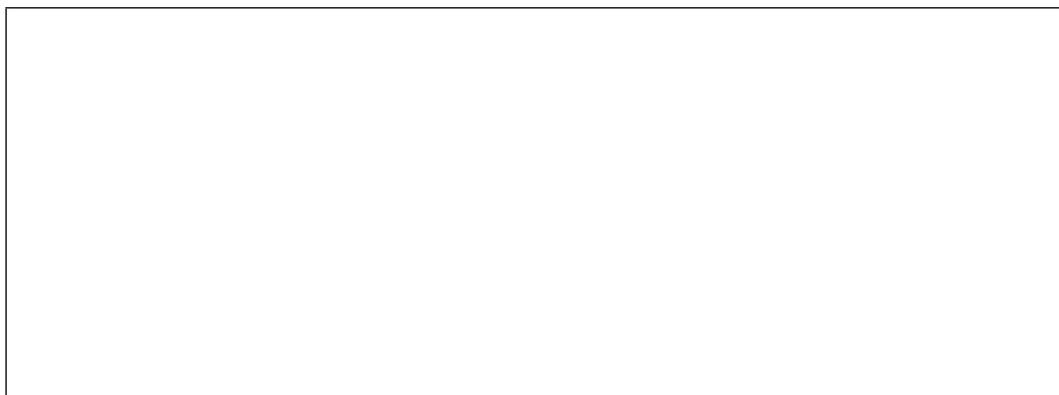
Draw a pie chart to show the composition of air.

# Assessment

## Units 1-6

1. Answer the following questions:

- (a) What gives the body its shape?
- (b) Why do the leaves of a plant move to face the light?
- (c) What is a food web? Draw a food web below:



- (d) What kind of food should you eat to stay healthy?
- (e) Name the three states of matter.

2. Fill in the blanks:

- (a) The fuel for the human body is ..... (**food**)
- (b) Fish have \_\_\_\_\_ to swim in the water. (**fins**)
- (c) Most \_\_\_\_\_ plants make their own food. (**green**)
- (d) Proteins, fats, and carbohydrates are called \_\_\_\_\_. (**primary foods**)
- (e) \_\_\_\_\_ of the Earth's surface is covered with water. (**Three-fourths**)
- (f) Plants use sunlight to make food by a process called \_\_\_\_\_. (**photosynthesis**)
- (g) Anything that takes up space and has weight is called \_\_\_\_\_. (**matter**)
- (h) The change of water vapour (or gas) into liquid is called \_\_\_\_\_. (**condensation**)
- (i) \_\_\_\_\_ helps living things to breathe and stay alive. (**Oxygen**)
- (j) The three states of water are \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_. (**ice, water, water vapour**)



3. Fill in the table with Yes or No:

	Breathing	Burning
(a) Needs oxygen		
(b) Produces heat		
(c) Produces water vapour		
(d) Produces light		
(e) Produces carbon dioxide		

4. Name two methods of separating the parts of a mixture:

(a) \_\_\_\_\_ (b) \_\_\_\_\_

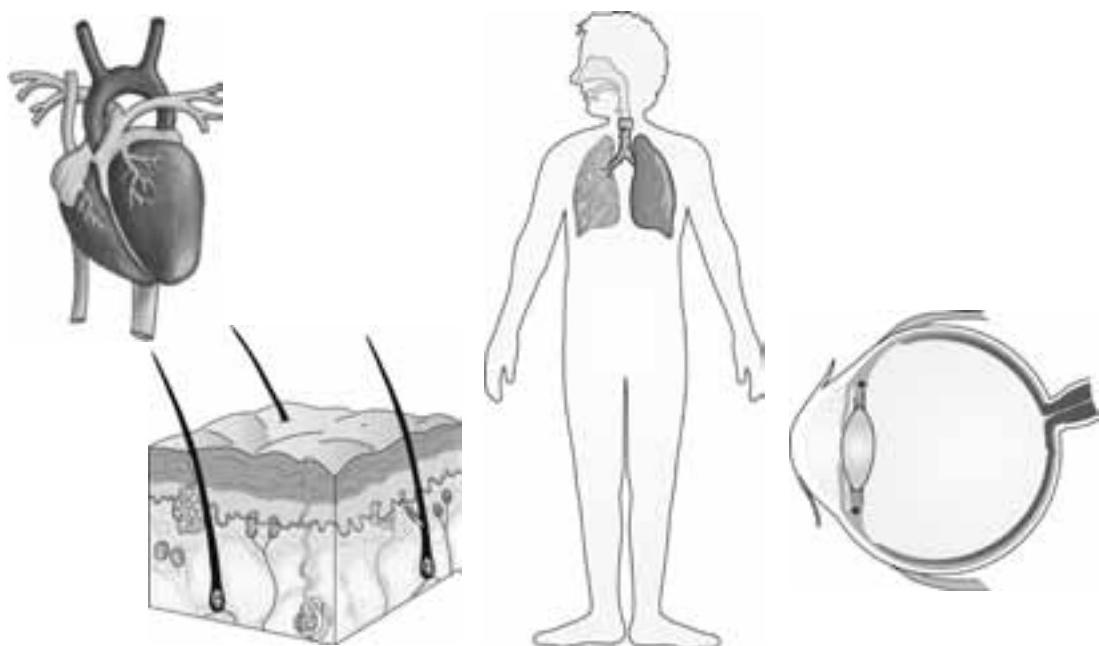
5. Label the diagrams:

heart

skin

eye

lungs



**Answers**

1. (a) The bones are joined together to make a skeleton. The skeleton gives the body its shape.
  - (b) The leaves turn to face the light because the plants need light to make their food.
  - (c) Consumers often eat more than one kind of food, so several food chains are connected to make a food web.
  - (d) To remain healthy we should eat the right kind of food from all the food groups in the right amounts. (some students may list various foods)
  - (e) Matter can be found in three states solids, liquids, and gas.
3.              Breathing                                      Burning
- |     |     |     |
|-----|-----|-----|
| (a) | Yes | Yes |
| (b) | Yes | Yes |
| (c) | Yes | Yes |
| (d) | No  | Yes |
| (e) | Yes | Yes |



## Magnets and magnetism

### Teaching objectives:

- to describe a magnet
- to describe natural as well as artificial magnets
- to describe the shapes of magnets
- to explain that magnetic force can act through non-magnetic materials
- to explain that the force of a magnet is strongest at the poles
- to explain that opposite poles attract each other, like poles repel each other
- to describe a magnetic field
- to describe how a magnet can be made and can be demagnetized
- to describe the kinds of magnets
- to describe keepers
- to explain the function and construction of a compass
- to explain that the Earth seems to have a huge magnet inside it
- to explain the uses of magnets

### Teaching strategy:

Show the students different kinds of magnets. **Ask:** Do you know what magnets are made of? Explain natural and artificial magnets. Write the word Alnico on the board. Explain that Alnico is an abbreviation of aluminium, nickel, and cobalt, the three metals which alnico magnets are made of. Explain that alnico magnets are the most powerful magnets.

Pick up steel pins and paper clips with a magnet. **Ask:** Why does a magnet pick up the steel pins? Can it pick up a toothpick? Explain that magnets have a magnetic force. A magnet can attract some metals such as iron, steel, nickel, and cobalt. **Ask:** Can a magnet attract pins through a piece of paper? Perform the experiment mentioned in the lesson and explain that magnetic force can act through non-magnetic materials.

Hold up a bar magnet. Hold pins close to it. **Ask:** Which part of the magnet holds the most pins? Perform the experiment in the lesson. Explain that the poles are the strongest part of a magnet. Hang a bar magnet by a string. Show the students that the magnet will stop in the North-South position of the Earth. Perform the experiment in the lesson to show that the opposite poles attract and similar poles repel each other.

Place a bar magnet on a sheet of paper. Sprinkle iron filings on the paper. Explain the magnetic field of a magnet, and the magnetic lines of force. Also explain that the force of a magnet is strongest at the poles.



Demonstrate the making of a magnet by stroking. Explain that magnets made of hard steel will remain magnets for a long time. Magnets made of soft iron lose their magnetism after sometime. Make an electromagnet with a battery and explain that an electromagnet will remain a magnet as long as the current flows through it.

**Ask:** Can a magnet lose its magnetism? Explain the methods by which a magnet can be demagnetized. Show the students some keepers placed between the poles of a horseshoe and U-shaped magnets. Explain why they are used.

Show the students a compass. **Ask:** What is a compass used for? Explain that a compass helps to find directions. It always points North due to the magnetic field. **Ask:** What can a magnet be used for? Explain the uses of magnets.

## **Answers to Exercises in Unit 7**

## **Additional Exercise**

### **MCQs**

- (a) An object that can attract iron or steel is called a \_\_\_\_\_.  
metal                      magnet                      machine                      [magnet]
- (b) Artificial magnets are made of hard \_\_\_\_\_.  
wood                      stone                      steel                              [steel]
- (c) When an electric current is passed through the coil of an electro magnet the iron rod inside the coil becomes a \_\_\_\_\_.  
current                      magnet                      wire                              [magnet]
- (d) The force, which holds objects to a magnet, is called \_\_\_\_\_.  
electrical force              pressure                      magnetic force                      [magnetic force]
- (e) Wood, rubber, and paper are \_\_\_\_\_ materials.  
magnetic                      non-magnetic                      neutral                              [non-magnetic]
- (f) The force of a magnet is strongest \_\_\_\_\_.  
at the poles                      in the centre                      around the magnet                      [at the poles]
- (g) \_\_\_\_\_ poles of a magnet attract each other.  
Similar                      Opposite                      No                                      [Opposite]
- (h) Keepers stop a magnet from losing its \_\_\_\_\_.  
magnetism                      atoms                      molecules                              [magnetism]
- (i) Magnets that are used in electric bells are called \_\_\_\_\_.  
bell magnets                      sound magnets                      electromagnets                      [electromagnets]
- (j) A small instrument which helps us to find directions is called \_\_\_\_\_.  
a watch                      a thermometer                      a compass                              [compass]

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 7</b> <b>Topic: Magnets and magnetism</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Magnets	<ul style="list-style-type: none"> <li>• to explain what a magnet is</li> <li>• to explain what natural and artificial magnets are</li> <li>• to describe different types of magnets</li> </ul>	<ul style="list-style-type: none"> <li>• explain what a magnet is</li> <li>• describe the shapes of magnets</li> <li>• explain what an electromagnet is</li> </ul>	Different types of magnets, an iron rod, a coil of wire, a battery cell, paper clips	Reading: p 61 Activity: 1 CW: Q2, Q5 HW: Q1 (a) (b) (c) (e)

**Key words:** magnet, magnetite, lodestone, electromagnet

**Method:** Show the students different magnets. **Ask:** What is a magnet? Explain that a magnet is an object that can attract iron. **Ask:** What are magnets made of? Talk about natural and man-made magnets. Write the word ALNICO on the board. Explain that this is an abbreviation of the names of metals used to make the most powerful magnets. AL stands for aluminium, NI for nickel, and CO for cobalt.

Make an electromagnet with a coil of wire wound round an iron rod. Attach it to a battery cell and bring it close to some paper clips. **Ask:** What happens to the paper clips? Explain what an electromagnet is.

## Lesson plan

Date:

Time: 40 mins

Unit: 7 <b>Topic: Magnets and magnetism</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. The force of a magnet	<ul style="list-style-type: none"> <li>• to explain what magnetic force is</li> <li>• to explain that magnetic force can act through non-magnetic materials</li> <li>• to demonstrate that the force of a magnet is strongest at the poles</li> <li>• to explain that opposite poles attract each other</li> <li>• to explain various methods to demagnetize a magnet</li> <li>• to explain how to prevent a magnet from losing its magnetism</li> </ul>	<ul style="list-style-type: none"> <li>• explain what the force of a magnet is</li> <li>• explain that magnetic force can act through non-magnetic materials</li> <li>• explain that the magnetic force of a magnet is strongest at the poles and that opposite poles attract each other</li> <li>• demonstrate how a magnet can be demagnetized</li> <li>• explain how keepers can be used to prevent a magnet from losing its magnetism</li> </ul>	A bar magnet, steel pins, toothpicks, wooden ruler, an eraser, an iron nail, a sheet of thin card	Reading: p 61, 62 Activity: 2, 4, 5 CW: Q3, Q6 HW: Q1 (f) (g)

**Key words:** magnetic force, non-magnetic material, attract, repel, demagnetize, keeper

**Method:** Try to pick up steel pins, paper clips, and toothpicks with a bar magnet. **Ask:** Why does the magnet pick up the pins and not the toothpicks? Explain that magnets have a magnetic force. A magnet can attract items made of the metals iron, steel, nickel, and cobalt.

Contd.

**Ask:** Can a magnet attract steel pins through a sheet of thin card? Perform the experiment to demonstrate that magnetic force can act through non-magnetic materials.

Hold a magnet close to a pile of paper clips. **Ask:** Which part of the magnet holds the most pins? Explain that the magnetic force of a magnet is strongest at the poles.

Suspend a bar magnet on a length of string. Swing the magnet and observe its direction as it stops. Explain that the magnet points to the north-south position of the Earth.

Perform the experiment of attraction and repulsion described on p 62 to show that opposite poles attract and similar poles repel each other.

**Ask:** Can a magnet lose its magnetism? Explain the ways by which a magnet can lose its magnetism.

Show the students keepers placed between the poles of a horseshoe magnet. Explain their use.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 7</b> <b>Topic: Magnets and magnetism</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Uses of magnets	<ul style="list-style-type: none"><li>to discuss the uses of magnets</li></ul>	<ul style="list-style-type: none"><li>explain that magnetism can be very useful</li></ul>	A compass, a loud speaker, pictures of a crane sorting scrap metal, an electric door bell, a diagram of the Earth's magnetic field	Reading: p 63 Activity: 3 CW: Q4 HW: Q1 (d)

**Key words:** electromagnet, compass, magnetic field

88

**Method:** Suspend a bar magnet on a length of string and give it a twist. Let it come to rest. **Ask:** What is the position of the magnet? Which is the north end of the magnet? Explain that the Earth has a magnetic field and the bar magnet always aligns itself with it, when suspended.

Show the students a compass. **Ask:** What is a compass used for? Explain that the small needle inside the compass is a magnet. It always points to the geographical north of the Earth. Explain how a compass is used by cars, planes, ships, etc. to find direction.

Show the students pictures of different machines and gadgets that use electromagnets. Discuss the uses of magnets.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Fill in the blanks to complete the sentences.

- a) Any material that can attract iron is called a \_\_\_\_\_.
- b) A natural magnet is called a \_\_\_\_\_.
- c) Artificial magnets are made of hard \_\_\_\_\_.
- d) \_\_\_\_\_ magnets are the most powerful.
- e) The force which holds objects to a magnet is called  
\_\_\_\_\_.

2. Draw the Earth's magnetic field.



3. Describe two ways in which a magnet can be demagnetized.

---

---

---



## Sound

### **Teaching objectives:**

- to explain how vibrations produce sound, both loud and soft
- to explain that sound needs a medium to be produced
- to explain that sound travels better through solids than through liquids and gases
- to explain that sound travels at different speeds
- to explain how musical sounds and noise are produced
- to explain how echoes are used in echo detection and echolocation

### **Teaching strategy:**

**Ask:** What kind of sounds can you hear just now? How are these sounds produced? Which sound is loud? How is music produced by a guitar? Explain the production of sound by vibrations. Explain how vibrations make the particles of air bump into each other and are pressed and spread to produce sound waves. **Ask:** Will a loud or soft sound be produced if we strike a drum hard? Explain loud and soft sounds.

**Ask:** Can sound travel through materials? Explain that sound travels fastest in solids. **Ask:** Can we hear the sound of explosions taking place on the Sun? Explain that sound cannot travel in space because there are no particles to produce sound waves. **Ask:** Can you hear better by putting your ear close to a closed door? Explain that sound travels at different speeds through different materials.

**Ask:** What is music? What is noise? Explain the difference between musical sounds and noise. **Ask:** What happens when you shout or clap in an empty room? Explain the reflection of sound and the production of an echo. **Ask:** Do you know how scientists can find out the depth of an ocean? Explain the method of echo detection. **Ask:** How do bats find their way in the dark? Explain the method of echolocation.

### **Answers to Exercises in Unit 8**

1. (a) Sound is produced by anything that vibrates.  
(b) When the vibrating air makes our eardrums vibrate, we hear sound.  
(c) A vibrating body, first makes the molecules of air press together and then spread apart. The vibrations pass from molecule to molecule to make a sound wave.  
(d) No, sound cannot travel through space because there is no air in space.  
(e) Musical and noisy sounds are made by a number of different vibrations reaching our ears at the same time.  
(f) When sound waves hit a barrier, such as a cliff, they bounce back and we can hear the sound again. This reflected sound is called an echo.

- (g) Echoes are used by scientists to find the depth of oceans, to detect shoals of fish, submarines and wrecked ships, and to make maps of the seabed.
2. (a) (i) drum (ii) horn  
(b) (i) ticking of a clock (ii) rain  
(c) (i) violin (ii) piano  
(d) (i) jet engine (ii) firecracker

## **Additional Exercise**

### **MCQs**

- (a) Vibrations caused by the shaking movements of the air help to produce \_\_\_\_\_.  
sound heat electricity [sound]
- (b) When particles pass their energy from one molecule to the next the movement is called a \_\_\_\_\_.  
water wave sound wave electrical wave [sound wave]
- (c) A \_\_\_\_\_ sound is heard when the vibration is small.  
low high noisy [low]
- (d) Sound cannot travel through space because there is no \_\_\_\_\_.  
water land air [air]
- (e) Sound travels better through \_\_\_\_\_ and liquids.  
air water solids [solids]
- (f) Unpleasant sounds are called \_\_\_\_\_.  
noise music vibrations [noise]
- (g) Sound waves bounce off \_\_\_\_\_, hard surfaces.  
smooth shiny rough [smooth]
- (h) Sound that is \_\_\_\_\_ is called an echo.  
dispersed reflected refracted [reflected]
- (i) Bats can catch insects in the dark by \_\_\_\_\_.  
echo sounders echo detection echo location [echo location]
- (j) Very loud sounds can damage the \_\_\_\_\_.  
eyes ears teeth [ears]

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 8</b> <b>Topic: Sound</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Sound	<ul style="list-style-type: none"> <li>• to explain how we hear sounds</li> <li>• to explain how sound is produced</li> <li>• to discuss different kinds of sounds</li> </ul>	<ul style="list-style-type: none"> <li>• explain that sound is produced by vibrating bodies</li> <li>• describe the production of sound waves</li> <li>• explain how loud and soft sounds are produced</li> </ul>	A drum, a hand bell, a guitar, a gong	Reading: p 68 Activity: 1 HW: Q1 (a) (b) (c)

**Key words:** sound, vibration, sound wave, loud, soft, expand

**Method:** Ask the students to sit quietly and listen to sounds in the room. Make a list of all the different sounds.

**Ask:** How do we hear sounds? Explain that every sound that we hear is caused by something shaking. Things that produce sound shake back and forth very quickly. These shaking movements are called vibrations. Vibrations cause the air in front of them to vibrate; when the vibrations reach our ear, they cause the ear drums to vibrate and we hear the sound.

**Ask:** How is sound produced? Explain that vibrations cause tiny particles of air to bump into each other. When this happens, the particles are first pressed together and then they spread apart, or they expand. Each particle passes its energy to the next particle and in this way vibrations are passed on from molecule to molecule. This movement is called a sound wave. Draw a sound wave on the board and explain it.

**Ask:** What kind of sound is produced if we strike a drum hard? Will the sound be soft or loud? Explain that a loud sound is produced by a larger vibration and a soft sound is produced by a smaller vibration. Discuss the sounds produced by different objects.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 8</b> <b>Topic: Sound</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. How sound travels	<ul style="list-style-type: none"> <li>• to explain how sound travels</li> <li>• to describe different types of sound</li> </ul>	<ul style="list-style-type: none"> <li>• explain that sound travels at different speeds through different materials</li> <li>• differentiate between pleasant and unpleasant sounds</li> </ul>	A wooden table, a bottle of water, a balloon, a stopwatch, a glass tumbler, pictures of musical instruments	Reading: p 69 Activity: 2 CW: Q2 HW: Q1 (d) (e)

**Key words:** space, vibration, musical, noise

73

**Method: Ask:** How do we hear sounds? Can we hear sounds coming from the next room? Can we hear sounds when we are swimming underwater? Can we hear the sounds coming from outer space?

Explain that sound travels at different speeds through different materials. As we have learned earlier, sound needs a medium to travel in; we cannot hear sounds from outer space as there is no air to vibrate.

**Ask:** Does sound travel better through solids, liquids, or gases? Ask a student to go outside the classroom and close the door behind him. Ask him/her to put his/her ear to the door and listen. Ask the student to come back into the classroom and tell you what s/he heard. Explain that sound travels best through solids. Hold a watch between your teeth. Can you hear the ticking? Explain that teeth are solid so sound can travel through them.

**Ask:** How do whales and dolphins communicate with each other in the water? Explain that sounds can travel through water.

Explain that sound travels at different speeds through different materials.

**Ask:** What is music? Do you find it pleasant or unpleasant? Explain that sound that is pleasing to the ears is musical. Sounds which we find unpleasant are called noise. Musical sounds and noise are produced by a number of different vibrations reaching our ears at the same time.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 8</b> <b>Topic: Sound</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Reflection of sound  Noise pollution	<ul style="list-style-type: none"> <li>• to explain what reflection of sound is</li> <li>• to explain how reflection of sound is used</li> <li>• to explain what noise pollution is</li> </ul>	<ul style="list-style-type: none"> <li>• explain that reflection of sound is called an echo</li> <li>• explain how echoes are used by scientists and animals</li> <li>• explain the causes and effects of noise pollution and suggest ways to reduce it</li> </ul>	Pictures and diagrams of ships and bats, a chart of measures to reduce or control noise pollution	<p>Reading: p 69, 70 Collect pictures of things which make pleasant and unpleasant sounds. HW: Q1 (f) (g)</p>

74

**Key words:** bounce, echo, echo detection, echo sounder, echolocation

**Method: Ask:** How do sound waves reach us? Discuss reflection of light and explain that, in the same way, sound is reflected when it strikes a hard surface. This bouncing back of sound is called an echo. This means that when sound waves hit a physical barrier such as a cliff or a wall, they bounce back and we can hear the sound again. The reflected sound is called an echo. We hear louder echoes in a tunnel or a covered place such as a hall.

**Ask:** How can we make use of echoes? Explain that scientists have invented some instruments which can be used by fishermen to detect shoals of fish in the sea. Explain how an echo sounder works.

**Ask:** Do bats have eyes? Can bats see? Explain that bats do have eyes but they cannot see. They use echoes to detect and catch flying insects. Explain echolocation in bats.

**Ask:** What is noise? Explain that noise is any sound that is unpleasant. Ask the students to name some unpleasant sounds around them. Discuss noise as a form of pollution of the environment. Discuss the effects of noise pollution, and the ways in which it can be reduced and controlled.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Underline the correct word(s):

- (a) Movements that make the air shake back and forth are called waves / vibrations.
- (b) The passing of energy from one particle to the next is called a vibration / sound wave.
- (c) Striking a gong hard makes a loud / soft sound.
- (d) Sounds cannot travel through solids / space.
- (e) Sound travels better through solid / liquids.
- (f) Sounds that we find unpleasant are called noise / music.
- (g) Reflected sound is called an echo / ray.
- (h) Very loud sound can damage the eyes / ears.

2. Match the description to the correct term.

**Description**

**Term**

What is produced when sound waves hit a barrier and bounce back so that we hear the sound again.

echo sounder

An instrument that is used to send sound waves into the sea to detect shoals of fish, and to make maps of the seabed.

echolocation

High squeaking sounds made by bats to find their way in the dark and to catch flying insects.

echo



## Static electricity

### **Teaching objectives:**

- to describe the structure of an atom
- to describe ions
- to describe static electricity
- to explain electrostatic induction
- to describe how we can test the presence of a charge
- to describe lightning
- to describe an electric circuit
- to describe the importance of a switch
- to describe conductors and insulators

### **Teaching strategy:**

**Ask:** What is matter made up of? Draw the structure of an atom and explain. Draw two atoms and explain how ions are formed. The atom that gives away an electron becomes a positively charged ion, and the atom that receives an electron becomes a negatively charged ion.

Tell a student to brush his/her hair vigorously with a plastic comb and bring it near bits of paper.

**Ask:** Why are the papers sticking to the comb? Explain the production of static electricity and the induction of charges by rubbing. Rub a rubber balloon with a woollen cloth and hold it against the wall. **Ask:** Why does the balloon stick to the wall? Explain that rubbing produces static electricity.

Take the students to the laboratory and show them a gold leaf electroscope. Demonstrate why the leaves repel each other when a charged body is brought close to the metal ball of the electroscope.

**Ask:** Where do you see lightning? What is lightning? Explain how rubbing of clouds produces lightning. **Ask:** Why does lightning strike high buildings and trees? Explain that charged clouds induce opposite charges on the buildings and trees. When the charge becomes high, the electrons jump from the clouds to the buildings and trees, and lightning strikes. Explain the use of lightning conductors to prevent damage by lightning. Make an electric circuit with a cell, a bulb, and wires.

**Ask:** Why does the bulb light up? Explain the pathway of charged particles in an electric circuit. **Ask:** Will the bulb still glow if the cell is removed, or if the wire is detached? Explain open and closed circuits and the need for the source of electricity to push the charge. **Ask:** If a wooden strip is added to the circuit, will the bulb still glow? Why? Explain that materials that do not allow electrons to flow through them are called insulators. Metals are materials that allow electrons to flow through. They are called conductors. Do the activities. Summarize the lesson.



## **Answers to Exercises in Unit 9**



## Additional Exercise

MCOs

- (a) Protons have a \_\_\_\_\_ charge.  
negative                  positive                  neutral                  [positive]

(b) Electrons have a \_\_\_\_\_ charge.  
negative                  positive                  neutral                  [negative]

(c) Electricity that is not moving is called \_\_\_\_\_.  
current electricity       static electricity       magnetic electricity       [static electricity]

(d) A \_\_\_\_\_ object can be charged by a process called electrostatic induction.  
positive                  negative                  neutral                  [neutral]

(e) An instrument called a \_\_\_\_\_ can be used to test a body for the presence of a charge.  
gold leaf electroscope    microscope              telescope                  [gold leaf electroscope]

(f) The jumping of electrons between clouds, or from the clouds to the Earth is called \_\_\_\_\_.

lighting                      lightning                      electrifying                      **[lightning]**

(g) High buildings can be protected from damage due to lightning by fixing \_\_\_\_\_ on them.

lightning conductors    heat conductors    sound conductors    **[lightning conductors]**

(h) A cell of a battery is a source of energy, which pushes the \_\_\_\_\_ in a circuit.

charge                      heat                              light                              **[charge]**

(i) An electric current can be turned on and off by a \_\_\_\_\_.

fuse                              switch                              bulb                              **[switch]**

(j) The pathway by which an electric current moves along the wire is called \_\_\_\_\_.

a current                      a wave                              a circuit                              **[a circuit]**

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 9</b> <b>Topic: Static electricity</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Static electricity	<ul style="list-style-type: none"> <li>• to describe the structure of an atom</li> <li>• to explain what ions are</li> <li>• to explain what static electricity is</li> </ul>	<ul style="list-style-type: none"> <li>• describe the structure of an atom and the charges on the particles</li> <li>• explain that when an atom gains electrons it becomes negatively charged and when an atom loses electrons it becomes positively charged</li> </ul>	Diagrams of the structure of atoms, diagrams of the formation of positive and negative ions	<p>Reading: p 74            CW: Q1 (a) (b)            HW: Q1 (c) (d)</p>

**Key words:** atom, proton, electron, neutron, positive charge, negative charge

**Method: Ask:** What is matter made up of? Draw the structure of an atom on the board. Explain the structure of an atom. Draw two atoms on the board and explain the formation of ions. When two atoms come close to each other, one atom gives away an electron and becomes a positively charged ion and the atom that receives the electron becomes a negatively charged ion. Explain that materials that gain electrons have a negative charge and materials that lose electrons have a positive charge.

**Ask:** What is the meaning of static? Explain that static means not moving. Electricity that is not moving is called static electricity; it stays in one place. Static electricity is produced when materials rub against each other.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 9</b> <b>Topic: Static electricity</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. Electrostatic induction	<ul style="list-style-type: none"> <li>• to explain what electrostatic induction is</li> <li>• to describe how the presence of a charge can be tested</li> <li>• to explain how electrostatic induction occurs in nature</li> </ul>	<ul style="list-style-type: none"> <li>• explain that a neutral body can gain a positive or a negative charge by a process called electrostatic induction</li> <li>• describe how a body can be tested for the presence of a charge</li> <li>• explain that lightning is a product of electrostatic induction in nature</li> </ul>	A plastic ruler, a plastic comb, a metal ball, a gold leaf electroscope, a picture of a lightning bolt, an inflated balloon, a piece of woollen cloth	Reading: p 74, 75 Activity: 1, 2, 3, 4 CW: Q2, Q3 HW: Q1 (e) (f) (g)

**Key words:** electrostatic induction, attract, repel, gold leaf electroscope, lightning

**Method:** Ask a student to comb his/her hair vigorously with a plastic comb and then hold the comb close to tiny pieces of paper. **Ask:** Why are the pieces of paper sticking to the comb? Explain that the plastic comb became charged while combing the hair, and when it was brought close to the pieces of paper, they became charged with the opposite kind of charge and the two charges attracted each other. Explain the production of static electricity and the induction of charges by rubbing. Rub an inflated balloon with a piece of woollen cloth and hold the balloon against the wall. **Ask:** Why does the balloon stick to the wall? Explain that rubbing produces static electricity. Take the students to the laboratory and show them a gold leaf electroscope. Demonstrate how the leaves repel each other when a charged body is brought close to the metal ball of the gold leaf electroscope.

**Ask:** When do we see lightning in the sky? What is lightning? Explain how the rubbing together of the clouds produces charges in them. **Ask:** Why does lightning sometimes strike high buildings and trees? Explain that charged clouds induce opposite charges on the building and trees. When the charge becomes very high, the electrons jump from the clouds, and lightning strikes. Explain the use of lightning conductors to prevent damage by lightning.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 9</b> <b>Topic: Static electricity</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Current electricity  Conductors and insulators	<ul style="list-style-type: none"> <li>• to explain what a current is</li> <li>• to explain what current electricity is</li> <li>• to explain the importance of a switch</li> <li>• to explain what conductors and insulators are</li> </ul>	<ul style="list-style-type: none"> <li>• define current electricity</li> <li>• describe a simple circuit, explain the importance of a switch in a circuit</li> <li>• explain that materials that allow an electric charge to pass through them are called conductors and that insulators do not allow an electric charge to pass through them</li> </ul>	A bulb, a battery cell, copper wires, a switch, samples of conductors and insulators	Reading: p 75, 76 Activity: 5 HW: Q1 (h) (i) (j)

**Key words:** electric circuit, electric current, battery cell, bulb, wire, switch

**Method:** Set up an electric circuit and explain its components. **Ask:** Why does the bulb light up? Explain the pathway of the charged particles in an electric circuit. **Ask:** Will the bulb still glow if the battery cell is removed or the wires are detached? Why? Explain open and closed circuits and the need for a source of electricity to push the charge through the circuit. **Ask:** If a wooden ruler is added to the circuit will the bulb still glow? Why? Explain that materials that do not allow electrons to flow through them are called insulators. Metals are materials that allow electrons to flow. They are called conductors.

**Ask:** How can a circuit be turned on and off? Explain the role of the switch in controlling the flow of electricity. The switch forms a bridge in the path of the flow of electricity. Use a model to explain how a switch works.

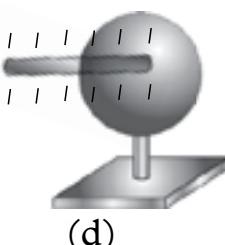
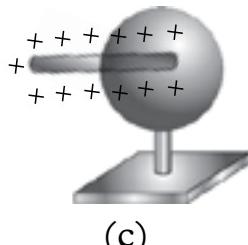
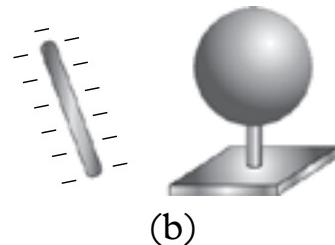
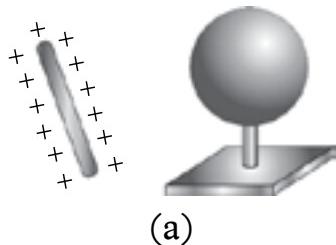
Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Underline the correct word(s):

- (a) An electron has a negative / positive charge.
- (b) Electricity that is not moving is called current electricity / static electricity.
- (c) When a charged body is brought close to a neutral object, it produces the same / an opposite charge in the object.
- (d) If a charged body is brought close to the metal ball of a gold leaf electroscope, the gold leaves will attract / repel each other.
- (e) Clouds become charged when tiny droplets or crystals of ice present in the clouds rub / hit against each other.
- (f) The pathway along which charged particles can flow is called a static current / electric current.
- (g) A switch / battery is used to turn a current on and off.
- (h) Materials that allow an electric charge to pass through them are called insulators / conductors.

2. Draw the correct charge on the metal ball in each of the diagrams.





Heat

## **Teaching objectives:**

- to explain that all things are made up of molecules which are groups of atoms
  - to explain that the movement of molecules produces heat
  - to explain that to find out temperature we use a thermometer
  - to describe the construction of a thermometer
  - to explain the Celsius scale, the Fahrenheit scale
  - to explain the freezing point and boiling point of water on both scales
  - to explain the normal body temperature of human beings

## **Teaching strategy:**

Tell the students to rub their hands together. **Ask:** Do your hands feel warm? Explain that all things are made up of molecules. When the molecules move fast they produce heat. Rubbing hands makes the molecules move fast, so they produce heat. Perform the hot and cold water experiment mentioned in the Pupil's Book. **Ask:** Why did the hands feel different in the lukewarm water? Explain that our senses are not reliable. They are only relative.

**Ask:** How does a doctor know that you are sick? What does the thermometer tell him? Explain that we cannot find out the temperature of a body just by touching it. Show the students a clinical thermometer and a laboratory thermometer. Show them the scales marked on them. Dip them in warm and cold water and show them the movement of the liquid inside, on the scale. Take the temperature of a few students with a clinical thermometer. Show them the normal body temperature on the scale. Show the students how to make a bottle thermometer. Explain how it works.

## **Answers to Exercises in Unit 10**

## **Additional Exercise**

### **MCQs**

- (a) When we rub our hands they \_\_\_\_\_.  
become hot      become cold      stay the same      [become hot]
- (b) Groups of atoms are called \_\_\_\_\_.  
heat      molecules      mercury      [molecules]
- (c) Rubbing makes molecules move \_\_\_\_\_.  
faster      slower      at the same speed      [faster]
- (d) The movement of molecules produces \_\_\_\_\_.  
cold water      heat      ice      [heat]
- (e) We use an instrument called a \_\_\_\_\_ to find out the temperature of something.  
thermometer      tube      bulb      [thermometer]
- (f) The markings on the glass tube of a thermometer is called \_\_\_\_\_.  
temperature scale      mercury      freezing point      [temperature scale]
- (g) The bulb of a thermometer contains \_\_\_\_\_.  
cold water      warm water      mercury      [mercury]
- (h) The level of the mercury on the scale shows the temperature in \_\_\_\_\_.  
degrees      alphabets      pictures      [degrees]
- (i) The normal human body temperature is \_\_\_\_\_ F.  
98.6°      95.4°      100°      [98.6°]
- (j) The boiling point of water is \_\_\_\_\_ C.  
110°      95°      100°      [100°]

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 10</b> <b>Topic: Heat</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Heat	<ul style="list-style-type: none"> <li>• to explain that all things are made up of atoms and molecules</li> <li>• to explain that the movement of molecules produces heat</li> <li>• to demonstrate that our senses are not reliable in telling us how hot or cold something is</li> </ul>	<ul style="list-style-type: none"> <li>• explain that heat is produced by the movement of molecules</li> <li>• explain that we cannot depend on our sense of touch to find out exactly how hot or cold something is</li> </ul>	Three bowls, very cold water in one, lukewarm water in another, and hot water in the third	Reading: p 80 HW: Q1 (a)
<b>Key words:</b> heat, molecule <b>Method:</b> Perform the hot and cold water experiment on p 80. <b>Ask:</b> Why did your hands feel different in the lukewarm water? Explain that our senses are not always reliable. We cannot depend on them to find out how hot or cold something is. Ask the students to rub their hands together. <b>Ask:</b> How do your hands feel? Explain that all things are made up of molecules. When the molecules move fast, they produce heat. Rubbing your hands together makes the molecules move fast so they produce heat.				

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 10</b> <b>Topic: Heat</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. Thermometers Temperature scales	<ul style="list-style-type: none"> <li>• to explain what temperature means</li> <li>• to introduce the instruments used for measuring temperature</li> <li>• to explain the temperature scales</li> </ul>	<ul style="list-style-type: none"> <li>• define temperature</li> <li>• describe the construction and working of a thermometer</li> <li>• explain the different scales used to measure temperature</li> </ul>	A clinical thermometer, a laboratory thermometer, ice, boiling water, a chart of temperature scales	Reading: p 81, 82 Activity: 1, 2 CW: Q2, Q3 HW: Q1 (b) to (e) Project: Make a model of a laboratory and a clinical thermometer out of cardboard and paste them on a piece of chart paper. Write the rules of how to handle thermometers safely.

**Key words:** thermometer, temperature, temperature scale, Celsius, Fahrenheit

**Method: Ask:** What can we use to find out exactly how hot or cold something is? How does a doctor know that you have fever? What does the thermometer tell him/her? Explain that we cannot find out the temperature of a body simply by touching it. Show the students a clinical thermometer and a laboratory thermometer. Show them the scales marked on them. Dip the laboratory thermometer in cold water and then in hot water. Show them how the liquid inside moves along the scale marked on the tube of the thermometer. Ask them to read the temperature.

Take the temperatures of a few students with a clinical thermometer. Show them the normal body temperature on the scale.

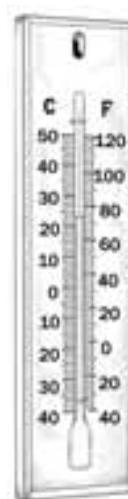
**Ask:** How can we find out the daytime and night temperatures? Explain that maximum and minimum thermometers are used at weather stations to record the extreme temperatures. If one is available, show the students a maximum and minimum thermometer and explain how it works.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Draw and label a clinical thermometer.

2. Mark the freezing point of water and the boiling point of water on the two scales.



3. Correct the incorrect statements:

- (a) All things are made up of tiny particles called atoms.
- (b) When molecules move fast they produce electricity.
- (c) We can tell how hot something is by using our hands.
- (d) When the bulb of a thermometer is dipped into hot water, the level of the mercury rises.
- (e) When the bulb of a thermometer is dipped into cold water, the level of the mercury rises.
- (f) The freezing point of water is 32°C.
- (g) The boiling point of water is 100°F
- (h) If you have fever, your body temperature will be below normal body temperature.



## Force and machines

### Teaching objectives:

- to describe a simple machine
- to describe the use of simple machines
- to describe how a machine helps us to do more work with less effort
- to explain that machines need energy to work

### Teaching strategy:

**Ask:** Can you name some machines which we use? Show a bottle opener to the students. Tell them it is a machine. Open a bottle of coke with an opener. Explain the use of the bottle opener as a simple machine. Explain that a machine helps us to do useful work with less effort. Cut a piece of cloth with a pair of scissors. Explain that a pair of scissors is a simple machine. Explain the meaning of a machine and its use.

**Ask:** Why is it better to use a machine rather than trying to do the same work with your hands? Explain the types of machines and the useful work that they do. Explain the mechanical advantage of machines. Show students the various types of levers and their use in everyday life. **Ask:** How can you push a heavy load uphill? Explain the use of an inclined plane. Show the students a wedge and explain that its shape is made up of two inclined planes. Explain how it works to cut hard things. Explain how it helps to increase and change the direction of the applied force. Show the students a screw. Explain how it is used to hold two pieces of wood or metals together. Show the students a simple wheel and an axle of a toy car. Wind a piece of string in the groove of the axle and attach a metallic object to the free end. Explain how heavy things can be hauled up by using a wheel and an axle.

**Ask:** Can heavy objects be lifted by applying a downward force? Explain the action of a pulley. Explain how the mechanical advantage can be increased by increasing the number of pulleys. **Ask:** What happens when you rub two stones together? Explain the heating up of the moving parts of a machine when they rub against each other.

### Answers to Exercises in Unit 11

1. (a) Force is a push or a pull, which is needed to bring about some kind of movement.  
(b) Forces can change the shapes of objects.  
Forces can make objects move faster or slower or stop them altogether.
- (c) The force of gravity cause objects to fall to the ground.
- (d) washing machine, mixer, bottle opener  
computer, stapler, photocopier  
car, cycle, road roller






## Additional Exercise

MCQs

- (a) The push or pull that is needed to bring about some kind of movement is called \_\_\_\_\_.  
force machine gravity [force]

(b) If you push a toy car it will move in the \_\_\_\_\_ direction in which it was pushed.  
same opposite backward [same]

(c) The kind of force which attracts objects towards the Earth is called the force of \_\_\_\_\_.  
push gravity attraction [gravity]

(d) Force can change the \_\_\_\_\_ of objects.  
colour state shape [shape]

(e) Machines need \_\_\_\_\_ to turn the moving parts inside them.  
energy food water [energy]

(f) Our forearm acts like a lever. Which part represents the fulcrum?  
wrist elbow muscles [elbow]

(g) When we use machines like levers and pulleys, \_\_\_\_\_.  
we can do less work move a large load with a small effort  
use less energy [move a large load with a small effort]

(h) A pulley is a simple machine which is made up of \_\_\_\_\_.  
levers wheels wires [wheels]

(i) Which of the following has a lever system in it?  
ear lobe knee cap finger [finger]

(j) The force which can produce an effect on an object at a distance without touching it is \_\_\_\_\_.  
force of gravity force of a pulley force of a lever [force of gravity]

## Lesson plan

Date:

Time: 40 mins

Unit: 11 <b>Topic: Force and machines</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
1. Force What forces can do	<ul style="list-style-type: none"> <li>• to explain what force is</li> <li>• to explain what forces can do</li> <li>• to explain the meaning of speed</li> </ul>	<ul style="list-style-type: none"> <li>• define what is meant by force</li> <li>• describe what forces can do</li> <li>• explain what speed is and calculate the speed of a moving object</li> </ul>	A toy car, a metre rule, a nut cracker, a rubber band, a sponge, Plasticine, a magnet, straight pins, a bar magnet, a coin	Reading: p 85, 86, 87 Activity: p 90 HW: Q1 (a) (b) (c)

**Key words:** force, move, stop, fast, slow, speed, squeeze, gravity

**Method:** Place a toy car on the table and push it. **Ask:** What happens? What makes the car move? Explain that any kind of movement needs some kind of a push or a pull. This push or pull is called force. **Ask:** Can we see force? Explain that we cannot see force but we can see what forces do.

Place a metre rule on the table and put a toy car next to it. Push the car. Mark its starting point and its stopping point on the metre rule. Place the car alongside the metre rule at the starting position and push it again, but harder this time. **Ask:** How far did the car travel? Has the car moved further this time? If you push the moving car in the opposite direction what will happen? Explain that the car will slow down and finally stop: this demonstrates that force can change the speed of an object.

**Ask:** What is speed? Explain that the speed of a moving body tells us how far it will travel in a specified amount of time. For example, if a car travels 100 km in one hour its speed is 100 km per hour.

Write on the board the formula for finding speed: distance travelled = speed x time.

Explain how this formula can be used to calculate how far a car will travel in a given time and how it can also be used to calculate the time it will take to cover a given distance.

Write the formula: time = distance / speed. Do the calculation suggested in the activity on p 86.

Stretch a rubber band between your thumbs. **Ask:** What has happened to the rubber band? Why do you think it has become longer? Squeeze a piece of Plasticine or a sponge. **Ask:** What happens? Explain that force can change the shape of objects.

Hold a magnet near some straight pins. **Ask:** What has happened? What caused the pins to move?

Toss a coin in the air. **Ask:** Why did the coin fall to the ground? Explain that forces can act on objects from a distance. Gravity is the force with which the Earth pulls all objects towards itself.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 11</b> <b>Topic: Force and machines</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
2. Machines	<ul style="list-style-type: none"><li>• to explain what a machine is</li><li>• to explain that machines need energy to work</li></ul>	<ul style="list-style-type: none"><li>• explain what a machine is</li><li>• explain that all machines need some kind of energy to do useful work</li></ul>	Pictures of a bicycle, a car, an aeroplane, a sewing machine, a washing machine, a clock, a steam engine, a spoon, a knife, a pair of scissors, a can opener, etc.	Reading: p 87 CW: Q1 (d) HW: Q1 (e) (f)

**Key words:** machine, energy, work, simple

**Method:** Show the students pictures of different machines. Explain that they are all machines. **Ask:** What is a machine? Is a knife a machine? Is a screw driver a machine? Explain that anything that helps to make work easier is called a machine. Discuss the different kinds of machine that we use at home and in offices and our work places. Hold up a spoon and ask the students whether it is a machine. Explain that a spoon, a knife, and a pair of scissors are all examples of simple machines. They help to make our work easier.

**Ask:** What does a machine need in order to work? Discuss fuel and energy and the power of our muscles which make it possible for machines to do their work.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 11</b> <b>Topic: Force and machines</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Simple machines	<ul style="list-style-type: none"> <li>• to explain what a simple machine is</li> <li>• to describe the different kinds of simple machine</li> <li>• to explain the uses of simple machines</li> <li>• to explain how machines make it possible to do more work with less effort</li> </ul>	<ul style="list-style-type: none"> <li>• explain what a simple machine is</li> <li>• describe the types of simple machine and their applications</li> <li>• explain how simple machines make our work easier</li> </ul>	A pair of scissors, a knife, a spoon, a tin can, pictures of a see-saw, a wheel barrow, a pulley, a rope, a wheel and axle	<p>Reading: p 88, 89            CW: Q2            HW: Q1 (g)</p>

**Key words:** lever, lever system, action, reaction, pulley, wheel, axle

**Method:** Show the students a spoon. Explain that it is a machine. Use the spoon to prise the lid off a tin can. Explain that the spoon has made it easier to open the can than opening it using only the fingers. Explain that a machine helps us to do useful work with less effort. Cut a piece of cloth with a pair of scissors. Explain that a pair of scissors is a simple machine.

**Ask:** Why is it better to use a machine rather than to do the same work with your hands? Explain the types of machine and the useful work that they do.

Show the students various types of levers and discuss their use in daily life.

**Ask:** Can you lift a heavy load?

Show the students the simple wheel and axle from a toy car. Wind a piece of string round the groove of the wheel and attach a small object to the free end. Explain how the wheel and axle can be used to haul heavy things.

**Ask:** Can heavy objects be lifted by applying a downward force? Draw diagrams on the board to explain the action of a pulley.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Use the formula: distance = speed x time, to calculate the distance travelled by a car moving at a speed of 100 km/h for 2 hours.

2. Use the formula : speed = distance/time, to calculate the speed of a car which travels 100 km in 2 hours.

Name: \_\_\_\_\_

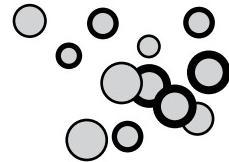
Date: \_\_\_\_\_

1. List five things that force can do:

- i. \_\_\_\_\_
- ii. \_\_\_\_\_
- iii. \_\_\_\_\_
- iv. \_\_\_\_\_
- v. \_\_\_\_\_

2. Mark the effort, load, and fulcrum on the following machines:





## Light

### **Teaching objectives:**

- to explain that we see things because of light
- to explain that light is a form of energy
- to explain that light travels very fast
- to explain that light can travel through spaces
- to explain that light travels in straight lines
- to explain reflection of light
- to explain the characteristics of an image formed in a mirror
- to explain luminous and non-luminous bodies

### **Teaching strategy:**

**Ask:** Can we see things in the dark? Can we see things in light? What would the world be without light? Explain the importance of light for plants and animals. **Ask:** What work can light do? How does a solar calculator work? Explain that light is a form of energy which helps us to work. **Ask:** Do you see lightning first or do you hear the clap of thunder during a thunderstorm? Explain that the speed of light is faster than the speed of sound.

**Ask:** What are stars? Why do stars give out light? How do we see stars when they are so far away? Explain that light can travel through space. Make a hollow tube of newspaper. Light a candle and place it on the desk. Ask a student to look at the flame through the tube. Bend the tube. Ask the student if he can see the flame. Explain that light cannot go round corners. It travels in straight lines.

Take a piece of cardboard. Make a pinhole in its centre. Shine a torch through the hole. **Ask:** What can you see? Make a slit in the cardboard and shine the torch through. **Ask:** What can you see now? Explain the difference between a ray and a beam. Show the students a toy laser light. Explain that a laser beam is a narrow beam of light of one colour. It is used by doctors to seal cuts. Shine a torch on a mirror. Explain the reflection of light.

**Ask:** How does light help you to see things? Explain that objects reflect light so we can see them. **Ask:** How do our rooms get light in the daytime? Explain the phenomenon of scattering of light with diagrams on the board. Hold a mirror in front of the class. Ask a student to stand in front of it. **Ask:** What can you see? Write the letter L on a piece of paper and hold it in front of the mirror. **Ask:** How does the letter L appear in the mirror? Explain the characteristics of the image formed in a plane mirror.

**Ask:** From where do we get light? Show the students pictures of the Sun, a candle, a bulb, and a fire. Explain that luminous bodies give out light of their own. **Ask:** What is moonlight? Does the Moon have its own light? Does a chair or table give out light? Explain that non-luminous bodies only reflect the light that falls on them.

## Answers to Exercises in Unit 12



## Additional Exercise

MCQs

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 12 Topic: Light</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. Light	<ul style="list-style-type: none"> <li>• to explain that we can see things because of light</li> <li>• to explain that light is a form of energy</li> <li>• to explain that light travels very fast</li> <li>• to explain that light can travel through space</li> </ul>	<ul style="list-style-type: none"> <li>• explain that we see things because light falls on them</li> <li>• explain that light is a form of energy</li> <li>• describe the properties of light</li> </ul>	Diagrams and pictures of sources of light, lightning, space	Reading: p 93 CW: Q1 (a) (b) HW: Q1 (c) (d)

**Key words:** light, energy, speed, space

**Method:** Start by asking the students if it is possible to see things in the dark. **Ask:** Can we see things when it is light? What would the world be like without light? Explain the importance of light for plants and animals.

**Ask:** Can light do useful work? Explain that light is a form of energy that helps us to do many things.

**Ask:** During a thunderstorm, do you hear the clap of thunder first or do you see the lightning?

Explain that because light travels faster than sound, we see the lightning before we hear the thunder.

**Ask:** What are stars? Why do stars give out light? How do we see stars when they are so far away?

Explain that light can travel through space.

## Lesson plan

Date:

Time: 40 mins

Unit: 12 Topic: Light	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. Light travels in straight lines	<ul style="list-style-type: none"> <li>to explain that light travels in straight lines</li> <li>to explain reflection of light</li> <li>to explain the characteristics of an image formed in a plane mirror</li> </ul>	<ul style="list-style-type: none"> <li>explain that light travels in straight lines</li> <li>explain the reflection of light</li> <li>describe the characteristics of an image formed in a plane mirror</li> </ul>	A candle, a drinking straw, a torch, a piece of cardboard, pictures of a ray, a beam, a laser beam, diagrams of reflection of light, a mirror	<p>Reading: p 94, 95 Activity: p 96 CW: Q2, Q3 HW: Q1 (e) (f) (g) (h)</p>

98

**Key words:** ray, beam, reflection, surface, mirror, image, inverted

**Method:** Roll up a newspaper to form a hollow tube. Light a candle and place it on the desk. Ask a student to look at the flame through the tube. Bend the tube and ask the student to look at the flame again. Explain that it is not possible to see the candle now because light cannot go round a corner. It travels in straight lines.

Take a piece of cardboard. Make a pinhole in its centre. Shine a torch through the hole. **Ask:** What can you see?

Make a slit in the cardboard and shine the torch through. **Ask:** What can you see now? Explain the difference between a ray and a beam.

Show the students a toy laser light. **Make it clear that laser lights should never be shone directly into the eyes.**

Explain that a laser beam is a narrow beam of light of one colour only. It is used by doctors to seal cuts on the skin. It is also now being used in telephone cables and to detect damage in underground pipes, etc.

Shine a torch on a mirror. With the help of diagrams on the board, explain the reflection of light.

How does light help us to see things? Explain that we can see objects because they reflect light.

**Ask:** How do our rooms get light in the daytime? Use diagrams on the board to explain the scattering of light.

Hold up a mirror and ask a student to stand in front of it. **Ask:** What can you see? Ask him/her to raise his/her right hand. Ask the students which hand they can see. Write the letter 'L' on a piece of paper and hold it in front of the mirror. **Ask:** How does the letter appear in the mirror?

Explain the characteristics of an image formed by a plane mirror.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 12</b> <b>Topic: Light</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. How do we see things?	<ul style="list-style-type: none"> <li>to explain what luminous and non-luminous bodies are</li> </ul>	<ul style="list-style-type: none"> <li>differentiate between luminous and non-luminous bodies</li> </ul>	Pictures and charts of the Sun, the Moon, the Earth	Reading: p 95 CW: Write the names of three luminous bodies and three non-luminous bodies. Worksheet

**Key words:** luminous, non-luminous, reflected light

**Method:** Ask where light comes from. Show the students pictures of the Sun, a candle, a bulb, and a fire. Explain that all bodies that give out their own light are called luminous bodies. **Ask:** What is moonlight? Does the Moon have its own light? Does a chair or table give out light? Explain that non-luminous bodies only reflect light that falls on them.

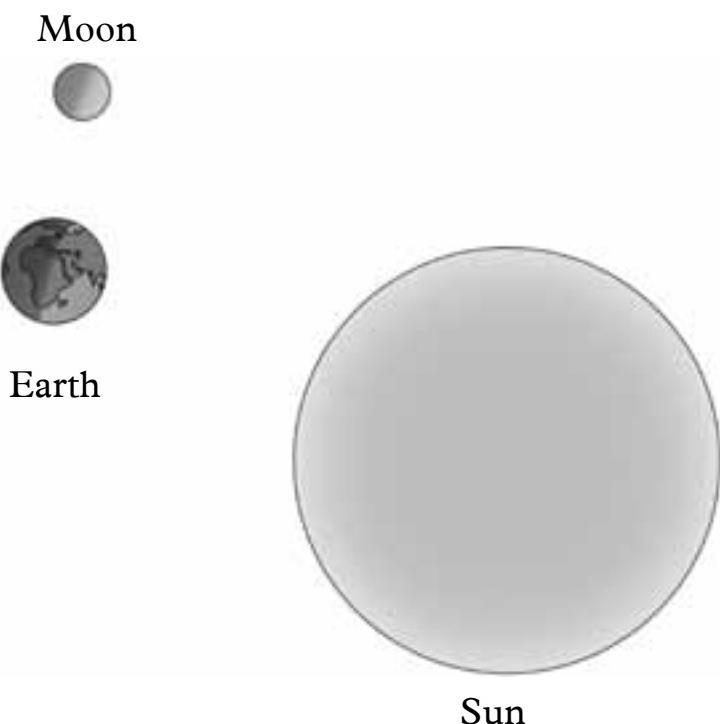
Name: \_\_\_\_\_

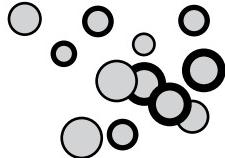
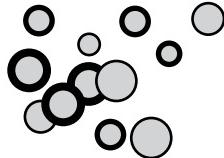
Date: \_\_\_\_\_

1. Fill in the blanks:

- (a) We see objects because \_\_\_\_\_.
- (b) Light is a form of \_\_\_\_\_.
- (c) Light can even travel through \_\_\_\_\_.
- (d) The speed of light is \_\_\_\_\_.
- (e) Light travels in \_\_\_\_\_.
- (f) The bouncing back of light is called \_\_\_\_\_.
- (g) Objects that give off light are called \_\_\_\_\_.
- (h) A laser beam gives out \_\_\_\_\_.
- (i) The image of an object formed in a plane mirror is \_\_\_\_\_.
- (j) Moonlight is actually sunlight which is \_\_\_\_\_.

2. Draw arrows on the given diagram to show how the Moon reflects sunlight.





## The Earth

### Teaching objectives:

- to explain that the Earth spins on its axis once in 24 hours
- to explain that the Sun seems to move from east to west due to the spinning of the Earth from west to east
- to explain how day and night are caused
- to explain how the change of seasons occurs
- to explain what constellations are
- to explain that the Big Bear is a constellation that is used to locate the North Star in the northern hemisphere

### Teaching strategy:

Show the students a globe. Spin it on its axis. Explain the rotation of the Earth. **Ask:** From where does the Sun rise? Where does the Sun set? Explain that the Sun does not move. The spinning of the Earth on its axis makes the Sun appear to move from east to west. Shine a torch on the globe from one side. Show that the part that is facing the Sun has daytime. Rotate the globe on its axis. Explain that as the Earth spins, the part that faces the Sun has day and the part that is away from the Sun has night. **Ask:** What are the seasons? Why do seasons change? Why is it hot in summer? Why is it cold in winter? Is it hot or cold in spring? Is it hot or cold in autumn?

Show the globe to the class. It is tilted on its axis. Shine a torch on the globe. **Ask:** Which part gets more heat and light from the Sun? Explain that the Earth takes 365 days to go round the Sun. The part that is tilted towards the Sun has summer. The part tilted away from the Sun has winter. Explain the change of seasons with the help of a chart.

**Ask:** What is a compass? How did people find directions in olden days? How did sailors find their way at the sea? How did travellers in the desert find their way? Explain that there are formations of groups of stars in the sky which always stay together. They are called constellations. They have fixed positions in the sky. Show the students charts of some constellations. Draw the Big Bear on the board. Explain that the pointer stars point to the North Star or Pole Star. Tell them to find the Big Bear and Pole Star at night.

### Answers to Exercises in Unit 13

1. (a) As the Earth spins on its axis the part of the Earth which faces the Sun has daytime. The part of the Earth that is on the other side has night.  
(b) During the revolution of the Earth around the Sun, sometimes the North Pole is tilted towards the Sun and it receives more light so it is warmer. It is summer in that part of the world. The part of the Earth which is tilted away from the Sun receives less light, so it is colder. It is winter in that part of the world.

- (c) The Moon is the Earth's natural satellite.
  - (d) The Moon revolves around the Earth once every lunar month or 29.5 days. When the side of the Moon lit by the Sun faces the Earth, we see a full Moon. When the Moon is on the side of the Earth nearest to the Sun we see a thin slice of the Moon.
  - (e) Groups of stars that seem to make shapes in the sky are called constellations.
  - (f) Few people live in mountains or deserts because it is either too cold or too hot there. Not much grows there.
2. satellite      384,000      air      dry      craters.
3. Refer to page 100
4. (a) spring      (b) summer      (c) autumn      (d) winter

## **Additional Exercise**

### **MCQs**

- (a) The shape of the Earth is \_\_\_\_\_.  
round      flat      geoid      [geoid]
- (b) The blanket of air around the Earth is called \_\_\_\_\_.  
atmosphere      biosphere      hemisphere      [atmosphere]
- (c) The imaginary line that passes through the North and South poles of the Earth is called \_\_\_\_\_.  
axis      equator      chord      [axis]
- (d) The movement of the Earth on its axis is called \_\_\_\_\_.  
evolution      revolution      rotation      [rotation]
- (e) The number of days that the Earth takes to make one revolution is \_\_\_\_\_.  
165      365      265      [365]
- (f) The change of seasons on the Earth is caused by the \_\_\_\_\_ of the Earth around the Sun.  
rotation      revolution      evolution      [revolution]
- (g) Groups of stars that seem to make shapes in the sky are called \_\_\_\_\_.  
stations      constellations      rotation      [constellations]
- (h) When the Moon is on the side of the Earth nearest to the Sun we can see \_\_\_\_\_.  
a new moon      an old moon      a full moon      [a new moon]
- (i) The Moon is \_\_\_\_\_ km away from the Earth.  
184,000      284,000      384,000      [384,000]
- (j) The rotation of the Earth takes \_\_\_\_\_.  
12 hours      24 hours      36 hours      [24 hours]

Lesson plan  
[REDACTED]

Date:

Time: 40 mins

<b>Unit: 13</b> <b>Topic: The Earth</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
1. The Earth	<ul style="list-style-type: none"> <li>• to explain that the Earth is a planet</li> <li>• to describe the characteristics of the Earth</li> </ul>	<ul style="list-style-type: none"> <li>• list the characteristics of the Earth</li> </ul>	Pictures of the Earth, the Solar System, a diagram of the atmosphere, a globe	Reading: p 98 List the characteristics of the Earth.

**Key words:** planet, Solar System, orbit, geoid, atmosphere

**Method:** Show the students a globe. **Ask:** What is the Earth? How big is the Earth? How does the Earth move around the Sun? What shape is the Earth? What is the atmosphere? Discuss the characteristics of the Earth. Ask the students to list the characteristics of the Earth.

## Lesson plan

Date:

Time: 40 mins

Unit: 13 <b>Topic: The Earth</b>	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
2. Movements of the Earth	<ul style="list-style-type: none"><li>to explain the movements of the Earth</li></ul>	<ul style="list-style-type: none"><li>explain what causes day and night</li><li>describe how changes of season take place</li></ul>	Diagrams of the rotation and revolution of the Earth, a globe	Reading: p 98, 99 Activity: p 103 CW: Q1 (a) (b) HW: Q4

**Key words:** rotation, revolution, axis, orbit, North Pole, South Pole, summer, autumn, winter, spring

**Method:** Show the students a globe. Spin it on its axis. Explain how the rotation of the Earth makes the Sun appear to move from east to west. Shine a torch on the globe from one side. Explain that the part that is facing the Sun has daytime. Rotate the globe on its axis. Explain that as the Earth spins, the part that faces the Sun has day and the part that is away from the Sun has night.

**Ask:** What are the seasons? Why do the seasons change? Why is it hot in summer? Why is it cold in winter? Is it hot or cold in spring? In autumn? Use the globe to show how the Earth is tilted on its axis. Shine a torch on the globe. **Ask:** Which part gets more heat and light from the Sun? Explain that the Earth takes 365 days to go round the Sun. The part that is tilted towards the Sun has summer. The part tilted away from the Sun has winter. Explain the change of seasons with the help of a chart or drawings on the board. When the Earth receives equal amounts of light, it is either spring or autumn.

## Lesson plan

Date:

Time: 40 mins

<b>Unit: 13</b> <b>Topic: The Earth</b>	<b>Teaching objectives</b>	<b>Learning outcomes</b> Students should be able to:	<b>Resources/Materials</b>	<b>Activities/CW/HW</b>
3. Constellations	<ul style="list-style-type: none"><li>• to explain what constellations are</li><li>• to explain how to recognize different constellations</li></ul>	<p>Students should be able to:</p> <ul style="list-style-type: none"><li>• explain that constellations are patterns of stars in the sky</li><li>• explain that the positions of the constellations can be used to find directions</li></ul>	Pictures of constellations	Reading: p 100 CW: Q3 HW: Q1 (e)

**Key words:** constellation, pointer star, Pole Star, North Star, Big Dipper

**Method: Ask:** How did people find directions in the past? How did sailors find their way across the seas? How did travellers find their way across deserts?

Explain that there are groups of stars in the sky which always stay together. They are called constellations. They have fixed positions in the sky. Show the students charts of constellations.

Draw a diagram of the Great Bear on the board. Explain that the pointer stars point to the North Star or the Pole Star.

## Lesson plan

Date:

Time: 40 mins

Unit: 13 Topic: The Earth	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
4. Land, water, and population on Earth	<ul style="list-style-type: none"><li>to explain that one-third of the Earth is land and two-thirds is water</li><li>to describe the distribution of the population on land</li></ul>	<ul style="list-style-type: none"><li>explain that only one-third of the Earth is made up of land</li><li>describe the distribution of people living in different areas on land</li></ul>	Pictures of the Earth, plains, river valleys, sea coasts, mountains, deserts	Reading: p 101 CW: Worksheet HW: Q1 (f)

**Key words:** population, land, water, plain, river valley, sea coast, mountain, desert

**Method:** Discuss the types of living areas of people on the land. Explain why many people live on plains, in river valleys, and along sea coasts and why fewer people live on mountains and in deserts.

## Lesson plan

Date:

Time: 40 mins

Unit: 13 Topic: The Earth	Teaching objectives	Learning outcomes Students should be able to:	Resources/Materials	Activities/CW/HW
5. The Moon	<ul style="list-style-type: none"><li>• to explain what type of a heavenly body the Moon is</li><li>• to describe the characteristics of the Moon</li><li>• to explain the phases of the Moon</li></ul>	<ul style="list-style-type: none"><li>• explain that the Moon is a natural satellite of the Earth</li><li>• describe the characteristics of the Moon</li><li>• explain why we see different phases of the Moon</li></ul>	Pictures of the Moon and the phases of the Moon	Reading: p 102 CW: Q2 HW: Q1 (c) (d)

**Key words:** Moon, crater, phase, lunar month, full moon, new moon

**Method:** **Ask:** What is the Moon? How far away is the Moon from the Earth? Discuss the characteristics of the Moon. **Ask:** How long does it take the Moon to go once round the Earth? Use pictures and diagrams to explain the phases of the Moon.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

1. Fill in the blanks:

- (a) The Sun and its \_\_\_\_\_ make up the Solar System.
  - (b) The planets follow oval paths or \_\_\_\_\_ around the Sun.
  - (c) The shape of the Earth is called a \_\_\_\_\_.
  - (d) The blanket of air surrounding the Earth is called the \_\_\_\_\_.
  - (e) The Earth is spinning on its \_\_\_\_\_.
  - (f) The axis of the Earth is tilted at an angle of about \_\_\_\_\_ degrees to its orbit.
  - (g) The movement of the Earth on its axis is called \_\_\_\_\_.
  - (h) The movement of the Earth around the Sun is called \_\_\_\_\_.
  - (i) The revolution of the Sun causes change of \_\_\_\_\_.
  - (j) The rotation of the Sun causes \_\_\_\_\_.
2. Draw the Big Dipper and draw arrows to show how it helps us to locate the North Star.

# Assessment

## Units 7-13

1. Answer the following questions:

- (a) What are artificial magnets made of?
- (b) What is reflection of sound?
- (c) What is static electricity?
- (d) How is heat produced?
- (e) Name some simple machines that help to make our work easier.
- (f) What are luminous bodies? Draw two luminous bodies.
- (g) How long does it take the Earth to spin on its axis? What is this movement called?

2. Fill in the blanks:

- (a) An object that can attract iron is called a\_\_\_\_\_.*(magnet)*
- (b) Sound cannot travel through space because there is no\_\_\_\_\_.*(air)*
- (c) Unpleasant sounds are called\_\_\_\_\_.*(noise)*
- (d) An \_\_\_\_\_ is a pathway along which charged particles can flow.*(electric circuit)*
- (e) Groups of atoms are called\_\_\_\_\_.*(molecules)*
- (f) We use a \_\_\_\_\_ to find out exactly how hot something is.*(thermometer)*
- (g) The \_\_\_\_\_ and the \_\_\_\_\_ are two examples of the lever system in our bodies.*(elbow, ankle joint)*
- (h) Light is a form of \_\_\_\_\_.*(energy)*
- (i) The moon does not give off light. It is a \_\_\_\_\_ body.*(non-luminous)*
- (j) The movement of the Earth around the Sun is called a \_\_\_\_\_.*(revolution)*

3. Write true or false:

- a) Magnets can attract papers. (*false*)
- b) If we like a sound we can call it musical. (*true*)
- c) In a Celsius scale, the freezing point of water is 0°C. (*true*)
- d) Force cannot change the speed of an object. (*false*)
- e) Light travels faster than sound. (*true*)

4. Which of the following are luminous bodies? Tick ✓ the correct answer.

- Sun
- fire
- desk
- candle
- tree

#### Answers

1. (a) Artificial magnets are made of hard steel.
- (b) The bouncing back of the sound waves from smooth, hard surface is reflection of sound.
- (c) Electricity which is not moving is called static electricity.
- (d) When molecules move fast they produce heat.
- (e) Some examples of simple machines are scissors, knife, wheel-barrow, bottle-opener, and nut-cracker.
- (f) Some objects give off light; they are called luminous bodies, e.g. Sun, electric lamps, bulbs, fires, etc.
- (g) It takes the Earth 24 hours to spin on its axis. This movement of the Earth is called rotation.